TERI
Workshop on
Information Handling and Dissemination in Energy and Environment
March 5–7 1997

Venue Exhibition Hall, Ground Floor, TERI

Programme

Wednesday, 5 March 1997

9 00 a.m	Registration	
9 40 a.m	Welcome address	Dr R K Pachauri, Director, TERI
9 50 a m	Introduction	Ms Nivedita, Dean, Information Services Division, TERI
10 00 a m	Journal literature and CCOD	Dr M C Shukla, TERI
10 30 a m	Newspaper clipping service	Ms N Deepa, TERI
11 00 a m	TEA	
11.10 a.m	Library automation : an overview of LibSys	Mr A K Jain, Info-Tek Consultants, Delhi
12 20 p m	Visit to Library and Publications Unit	Ms Bharati Paliwal, TERI/ Ms Meena Srikumar, TERI
1 00 p m	LUNCH	
2 00 p m	Abstracting services	Dr M C Shukla, TERI
2 50 p.m	TEA	
3 00 p m	Bibliographic databases—I	Mr Debal C Kar, TERI
5 00 p m	Discussion	

Thursday, March 6, 1997

9 30 a m	Bibliographic databases—II (Demonstration)	Mr Debal C Kar, TERI
11.00 a m	TEA	
11.10 a.m	Secondary services (Contd)	Mr Partha Bhattacharya, TERI
12 30 p m	Local Area Network	Mr M Karuppasamy, TERI
1.00 p m	LUNCH	
2 00 p.m	TERINET Services	Ms Indrani Nagar, TERI
3 10 p m	TEA	
3.20 p m	CD ROM Technology	Mr Satish Kumar, TERI

3 50 p m	CD ROM databases (demonstration)	Ms Uma Ramchandra, TERI
5 00 p.m	Discussion	

Friday, 7 March 1997

9.30 a.m	Electronic mail	Mr M Karuppasamy, TERI/ Mr Jagdish, TERI
10 00 a m	Internet basics and tools	Mr Satish Kumar, TERI
10 50 a m	TEA	
11 00 a m	Internet searching (Demonstration)	Ms Ritu Bhardwaj, TERI/ Mr Satish Kumar, TERI
12 30 p m	Discussion	
1 00 p m	LUNCH	
2 00 p m	Accessing online databases hosted by DIALOG	Mr S Bhandari, Matrix India
4 30 p m	Visit to Centre for Information Technology and Outreach Cell	Mr P Nanda Kumar, TERI/ Mr B Anil Kumar, TERI
5 00 p m	Concluding session	

1st DAY

Information sources on journal literature

Ulrich's International Periodicals Directory 1997

- contains information on nearly 165000 serials published throughout the world
- serials are arranged under 969 subject headings
- 6661 serials are available online
- 2240 serials are available on CDROM
- ten different indexes
- also available online (file 480) and as a CDROM database (Ulrich Plus)

Energy

- 1 Abstracting, bibliographies, statistics; 2 Computer applications, 3 Electrical energy, 4 Geothermal energy, 5 Hydroelectrical energy; 6 Solar energy, and 7 Wind energy

Environmental studies

- 1 Abstracting, bibliographies, statistics; 2 Computer applications; 3 Pollution; 4. Toxicology and environmental safety, and 5 Waste management

Directory of Indian Scientific Periodicals, 1992

- the directory comprises of two parts (periodicals and reports) and gives details of over 2000 periodicals published in India
- periodicals are arranged according UDC (universal decimal classification) scheme

National Union Catalogue of Scientific Serials in India (NUCSSI)

- a record of nearly 35000 titles published from 100 countries and held in more than 800 institutions in India
- will be available soon on CDROM

covers holdings information of nearly 350 libraries from India

CCOD (Current Contents on Diskette)

- Windows Environment
- Weekly; prepared by ISI (Institute for Scientific Information, USA)

  Sections available with TERI Library

  1. Agriculture, Biology and Environmental Sciences
  2. Engineering, Computing and Technology
  3. Life Sciences
  4. Physical, Chemical and Earth Sciences

- Searches on author/editor, title word, source, address word, discipline, language, document type (letter, editorial or article), keywords (both authors' and additional)
- Boolean searches using 'AND' and 'OR'
- Affiliations provided for reprint requests
- Search profile and Personal Interest Checklist can be prepared
- Print-out of Personal Interest Checklist helps in easy reference and serves as a record of the reprint requests sent

Contents DIRECT

- The pre-publication e-mail contents service
- Table of contents by e-mail FREE
- Contents pages delivered by e-mail, two to four weeks pre-publication
- Sent by e-mail on an issue by issue basis
- To subscribe to this free service (for journals published by Elsevier, Pergamon, North Holland. and Excerpta Medica) send message to CDsubs@elsevier co uk

Complete bibliographic details of the above sources are given below for your reference.

1 Salk J (ed) 1997 *Ulrich's International Periodicals Directory* New Jersey Bowker [in five volumes]

2 INSDOC 1992 *Directory of Indian Scientific Periodicals* New Delhi. INSDOC 314 pp.

3 Dutta S N (ed). 1988 *National Union Catalogue of Scientific Serials in India* New Delhi INSDOC [in four volumes].

4. Further details regarding CCOD can be obtained from ISI, 3501 Market Street, Philadelphia, PA 19104, USA.

TERI LIBRARY

Journal Titles - 1997

- AAAS Scope (Q)
- Abstracts of AIT Reports and Publications on Energy (Y)
- Abstracts of Romanian Scientific and Technical Literature (2-Y)
- Abstracts of Science and Technology in Japan: Electronics and Communications (M)
- Abstracts of Science and Technology in Japan: Energy Technology (M)
- Acta Botanica Indica (2-Y)
- Active Conservation Techniques (Q)
- ADB Business Opportunities (M)
- Administrator, The (Q)
- Agriculture Ecosystems & Environment (15-Y)
- Agroforestry Systems (Q)
- Agroforestry Today (Q)
- AICHE Journal (M)
- AID Research & Development Abstracts (2-Y)
- Alternatives (Q)
- Ambio (10-Y)
- American Economic Review (Q)
- American Journal of Agricultural Economics
- Annals of Forestry (2-Y)
- Annals of Lib. Science & Documentation (Q)
- Apanews (2-Y)
- Appliance Manufacture (M)
- Applied and Environmental Microbiology (M)
- Applied Energy (15-Y)
- Applied Soil Ecology (BM)
- Applied Thermal Engineering (M)
- Appropriate Technology (Q)
- Appropriate Technology: Documentation Bulletin (Q)
- Architecture and Design (Q)
- Arid Lands Newsletter (2-Y)
- ASHRAE Journal (M)
- ASHRAE Transactions (2-Y)
- ASHS Newsletter (M)
- Asia Environmental Business Journal (Q)
- Asia Pacific Community Forestry Newsletter (Q)
- Asia Pacific-Tech Monitor (Q)
- Asian Electronics Engineer (S-M)
- Asian Energy News (M)
- Asian Jr. of Environmental Management (2-Y)
- Asian Libraries (2-Y)
- Asian Power for Electricity Industry Business Manager (Q)
- Asian Transport Journal (Q)
- ASM News (M)
- ASME News (M)
- ASSET: Abstracts of Selected Solar Energy Technology (Q)
- ASTINFO Newsletter (Q)
- Atmospheric Environment (SM)
- Australian Energy News (Q)

- BAIF Journal, The (Q)
- Bamboo News (Q)
- Bangladesh Development Studies (Q)
- Bangladesh Journal of Scientific and Industrial Research (Q)
- Bhagirath (Q)
- BHEL Journal (2-Y)
- Bija (BM)
- Biocycle (M)
- Biodiversity and Conservation (M)
- Biodiversity Letters (Q)
- Bioenergy News (Q)
- Bioessays (M)
- Biogas Forum (Q)
- Biogas Newsletter (Q)
- Biomass and Bioenergy (M)
- Bioresource Technology (M)
- Biotechniques (M)
- Biotechnology (M)
- Biotechnology and Development Monitor (Q)
- Biotechnology and Development Review (Q)
- Biotechnology Letters (Q)
- Biotechnology Techniques (Q)
- Boiling Point (Q)
- British Commercial News (Q)
- Building and Environment (BM)
- Building Energy Simulation Usèr News (Q)
- Business India (S-M)
- Business Today (S-M)
- Business World (S-M)
- Byte (M)
- C A Selects: Batteries and Fuel Cells (M)
- C A Selects: Environmental Pollution (M)
- C A Selects: Membrane Separation (M)
- CAB Alerts on Mycorrhiza (M)
- California Agriculture (Q)
- Canadian Journal of Botany (M)
- Canadian Journal of Forest Research (M)
- Canadian Journal of Microbiology (M)
- CBE Views (Q)
- CDIAC Communication (Q)
- Cell, The (M)
- Centre for Building Science News (Q)
- Change (Q)
- Changing Villages: Rural News and Views (Q)
- Chemical and Engineering News (W)
- Chemical Engineering (M)
- Chemical Engineering Progress (M)
- Chemical Industry Digest (Q)
- Chemical Industry News (Q)
- Chrysanthemum Soc. of India Newsletter 3/7
- CIFOR News (Q)
- Circular on Desertification (Q)
- Climate Change Newsletter (Q)
- Climate Change Bulletin (Q)
- Climatic Change (M)
- CMIE: Monthly Review of the Indian Economy (M)

- Co-Operative Sugar (M)
- Coastal Management in Tropical Asia (2-Y)
- Cogen Magazine (2-Y)
- Cogeneration and Competitives Power Journal, The (Q)
- Common Property Resource Digest (Q)
- Computer World (M)
- Conservation Biology (BM)
- Consultancy Vision Newletter (3-Y)
- CRIEPI Quarterly Abstracts (Q)
- Crop Science (BM)
- CSE Notebook (Q)
- CSI Communications (M)
- Current Advances in Genetics and Molecular Biology (M)
- Current Contents on Diskette With Abstracts: Physical, Chemical and Earth Sciences (W)
- Current Contents on Diskette with Abstracts: Agriculture, Biology & Environ Sciences (W)
- Current Contents on Diskette with Abstracts: Life Sciences (W)
- Current Contents on Diskette with Abstracts: Engineering, Computing and Technology (W)
- Current Literature on Science of Science (M)
- Current Science (S-M)
- Data Communications (18-Y)
- Dataquest (SM)
- Development Alternatives (Q)
- Diesel and Gas Turbine (10-Y)
- Discover (M)
- Down to Earthn (SM)
- Down to Earth Newsletter (Q)
- Drilling and Exploration World (Q)
- Drought Network News (3/Y)
- E-Notes (Q)
- Ecoal (Q)
- Ecodecision (Q)
- Ecoforum (Q)
- Ecological Applications (Q)
- Ecological Economics (M)
- Ecological Economics Bulletin (Q)
- Ecological Monograph (Q)
- Ecologist, The (BM)
- Ecology (8-Y)
- Economic and Political Weekly (W)
- Economist, The (W)
- Editorial Eye (M)
- EDMC Energy Trend (M)
- EEE-NFS. News & Features (Q)
- Egyptian Journal of Agronomy (2-Y)
- Egyptian Journal of Microbiology (3-Y)
- Egyptian Journal of Soil Science (Q)
- Electric Power International (Q)
- Electrical India (S-M)
- Electrical Review (Q)
- Electrical World (M)
- Electricity Conservation Quarterly (Q)
- EMBO Journal (SM)
- EME Journal (Q)
- Encology (M)
- Ener Bulletin (Q)

- Energy Alert (Q)
- Energy and Buildings (BM)
- Energy and Fuel Users' Journal (Q)
- Energy And Fuels (BM)
- Energy Development Group Bulletin (2-Y)
- Energy Economics (Q)
- Energy Efficiency News (Q)
- Energy Efficiency Quarterly Bulletin (Q)
- Energy Engineering (Q)
- Energy Environment Monitor (2-Y)
- Energy in Japan (BM)
- Energy Journal (Q)
- Energy Laboratory (Q)
- Energy Magazine (3/Y)
- Energy Management (Q)
- Energy News (BM)
- Energy Opportunities (Q)
- Energy Policy (M)
- Energy Prices and Taxes (Q)
- Energy Quarterly (Q)
- Energy Sources : Journal of Extraction Conservation and Environment (8-Y)
- Energy Studies Review (3-Y)
- Energy Times (SM)
- Energy : The International Journal (M)
- Environment (M)
- Environment : A Quarterly Bulletin (Q)
- Environment & Development Economics
- Environment Bulletin (Q)
- Environment: Australia's International Agenda (3-Y)
- Environmental & Bioinformatics Newsletter (2-Y)
- Environmental and Resources Economics (8-Y)
- Environmental Conservation (Q)
- Environmental Management (BM)
- Environmental Manager (M)
- Environmental Monitoring & Assessment (M)
- Environmental News from the Netherlands (Q)
- Environmental Science and Technology (M)
- Envis Bulletin : Himalayan Ecology and Development (Q)
- Envis Newsletter (Q)
- EPRI Journal (M)
- Escap Energy News (2-Y)
- European Commission Environmental Research Newsletter (Q)
- Evergreen (2-Y)
- Everyman's Science (Q)
- Express Business Avenues (SM)
- Facing the Global Environment Challenge & Progress (Q)
- FAO Documentation: Current Bibliography (Q)
- Fabricator, The (Q)
- FEEM Newsletter (Q)
- FEMS Microbiology Letters (30-Y)
- FEMS Microbiology Reviews (8-Y)
- Fertilizer News (M)
- Forestry Abstracts (M)

- Forests Trees and People Newsletter (Q)
- Fuel and Energy Abstracts (6-Y)
- Fuel Science and Technology (Q)
- Gate (Q)
- Genetic Engineering and Biotechnology Monitor (Q)
- Genetics (M)
- Genome (BM)
- GISPRI Quarterly (Q)
- Global Change Newsletter (Q)
- Global Change Prisma (Q)
- Global Ecology and Biogeography Letters (Q)
- Global Environmental Change (Q)
- Glow (3-Y)
- Green Earth (Q)
- Green and Gold (M)
- Greenhouse Issues (BM)
- GRID (Q)
- Himalayas Ecology and Environment (2-Y)
- Hort Science (BM)
- Hort Technology (Q)
- Hydel (Q)
- Hydrocarbon Processing (M)
- Hydrocarbon Technology (Q)
- Hydro Review Worldwide (Q)
- Hydronet (Q)
- IAEA Bulletin (Q)
- IAEA Newsbriefs (Q)
- IAEEL Newsletter (Q)
- IASLIC Bulletin (Q)
- IASLIC Newsletter (BM)
- ICIMOD Newsletter : New Documents in Library (Q)
- IEA - Monthly Oil Market Report (M)
- IEEE Institute (M)
- IEEE Journal of Computer Aided Design (Q)
- IEEE Power Engg. Review (Q)
- IEEE Spectrum (M)
- IEEE Standards Bearer (Q)
- IEEE Transaction on Energy Conversion (Q)
- IEEE Transactions on Power Systems (Q)
- IEEE Transactions on Industry Applications (BM)
- IEED: Gatekeeper Series on Sustainable Agriculture (BM)
- Impact Assessment (Q)
- Independent Energy (M)
- Independent Sectors Network, The (Q)
- India Power (Q)
- Indian Cement Review (M)
- Indian Forester (M)
- Indian Foundry Journal (M)
- Indian Industrial Sources (M)
- Indian Journal of Agricultural Economics (Q)
- Indian Journal of Agricultural Sciences (M)
- Indian Jr. of Biochemistry & Biophysics (BM)
- Indian Journal of Chemical Technology (BM)
- Indian Journal of Chemistry (M)
- Indian Journal of Engineering & Materials Sciences (M)

- Indian Journal of Environmental Health (Q)
- Indian Jr. of Environmental Protection (M)
- Indian Journal of Experimental Biology (M)
- Indian Journal of Forestry (Q)
- Indian Jr. of Genetics & Plant Breeding (Q)
- Indian Journal of Marine Science (Q)
- Indian Journal of Microbiology (Q)
- Indian Mining & Engineering Journal (Q)
- Indian Journal Of Mycology and Plant Pathology (3-Y)
- Indian Journal of Petroleum Geology (Q)
- Indian Journal of Physics Sec. A & B (M)
- Indian Journal of Power and River Valley Development (M)
- Indian Journal of Pure & Applied Physics (M)
- Indian Journal of Soil Conservation (Q)
- Indian Journal of Transport Management (2-Y)
- Indian Nursery News (Q)
- Indian Science Abstracts (SM)
- Indian Sugar (M)
- Indian textile Journal (Q)
- Industrial and Engineering Chemistry Research (M)
- Industrial Equipment News (M)
- Industrial Products Finder (M)
- Industrial Products & News Reporter (Q)
- Industry and Environment (Q)
- Information Bulletin for Developing Countries (3-Y)
- Information Design Journal (3-Y)
- Information Technology for Develpt (2-Y)
- Information Today & Tomorrow (Q)
- Innovation & Technology Transfer (Q)
- Innovative ACR and Cool-n-conductive Environ (Q)
- Inpaper International (Q)
- Institute of Social Science Newsletter (Q)
- Institution of Engineers Journal (M)
- Intellectual Property Right (Q)
- International Academy of the Environment Newsletter (Q)
- International Chickpea and Pigeon Pea Newsletter (3-Y)
- International Environmental Affairs (Q)
- International Journal of Ambient Energy (Q)
- International Journal of Energy Research (M)
- International Journal of Hydrogen Energy (M)
- International Journal of Power and Energy Systems (3-Y)
- International Journal of Refrigeration (M)
- International Journal of Scientometrics and Informetrics (Q)
- International Plant Propogating Society Combined Proceedings (Y)
- International Politics & Society (Q)
- Invention Intelligence (M)
- IPGRI Newsletter (Q)
- Iranian Journal of International Affairs (Q)
- IRED Forum (Q)
- IREDA News (Q)
- Issues in Science and Technology (Q)
- IT Power News (Q)
- ITC Journal (Q)

- ITPI Journal (Q)
- Jagriti (M)
- Japac News (Q)
- Japan Economic Report (Q)
- Joint Implementation Quarterly (Q)
- Journal of Agricultural Engineering (Q)
- Journal of Air and Waste Management Association (Japca) (M)
- Journal of American Society of Horticultural Science (BM)
- Journal of Applied Bacteriology (M)
- Journal of Bacteriology (SM)
- Journal of Biogeography (BM)
- Journal of Consciousness Studies (Q)
- Journal Of Documentation (Q)
- Journal of Economic Literature (Q)
- Journal of Economic Perspective (Q)
- Journal of Energy and Development (2-Y)
- Journal of Energy, Finance and Development (2-Y)
- Journal of Energy in Southern Africa (Q)
- Journal of Energy Resources and Technology-ASME (Q)
- Journal of Engineering and Applied Science (2-Y)
- Journal of Engineering for Gas Turbine and Power-ASME (Q)
- Journal of Environment and Development, The (Q)
- Journal of Environment and Management (Q)
- Journal of Environmental Economics and Management (BM)
- Journal of Environmental Resources (Q)
- Journal of Exposure Analysis and Environmental Epidemiology (Q)
- Journal of Heat Transfer -ASME (Q)
- Journal of Indian Association for Environmental Management (3-Y)
- Journal of Indian Potato Association (Q)
- Journal of Indian Pulp and Paper Technical Association (Q)
- Journal of Indian Water Works Association (Q)
- Journal of Industrial Microbiology (M)
- Journal of Information Science (BM)
- Journal of Information Science and Technology (Q)
- Journal of Library and Information Science (2-Y)
- Journal of Materials Engineering and Performance (BM)
- Journal of Mines Metals and Fuels (Q)
- Journal of Mining Research (2-Y)
- Journal of Policy Modeling (BM)
- Journal of Power and Energy (Q)
- Journal of Power Sources (M)
- Journal of Quantitative Economics (Q)
- Journal of Regulatory Economics (Q)
- Journal of Rural Development (Q)
- Journal of Rural Energy (2-Y)
- Journal of Rural Reconstruction (2-Y)
- Journal of Scholarly Publishing (Q)
- Journal of Scientific & Industrial Research (M)
- Journal of Solar Energy Engineering - ASME (Q)
- Journal of Tree Sciences (Q)

- Journal of Tropical Forest Science (Q)
- Journal of Tropical Forestry (Q)
- Journal of Wind Engineering and Industrial Aerodynamics (M)
- Kanch Quarterly (Q)
- Khadi Gramodyog (M)
- Korea Energy Review Monthly (M)
- Korean Scientific Abstracts (BM)
- Kurukshetra (M)
- LAN Magazine (M)
- Letters in Applied Microbiology (M)
- Management Science (BM)
- Manager Update (Q)
- Manushi : A Journal about Women and society (BM)
- Mausam (Q)
- Mechanical Engineering (M)
- Meetings on Atomic Energy (Q)
- MEP News (Q)
- Microbiological Reviews (Q)
- Microbiology (M)
- Minenvis (Q)
- Minerals & Metals Review (Q)
- Minetech (BM)
- Mitigation & Adaptation Strategies for Global Change (Q)
- Molecular Breeding (Q)
- Monthly Abstracts of Statistics (M)
- Mycologia (BM)
- Mycological Research (Q)
- Mycological Society of America Newsletter (Q)
- Mycologist, The (Q)
- Mycorrhiza (BM)
- Mycorrhiza News (Q)
- National Geographic (M)
- National Products News (Q)
- Natural Resources and Development (2-Y)
- Natural Resources Forum (Q)
- Nature (W)
- Nature & Resources (Q)
- News at Seven (3-Y)
- New Phytologist, The (M)
- New & Renewable Energy Sources (Q)
- New Scientist (W)
- News EE: Environmental Education Networking Newsletter (Q)
- NIRD Newsletter (BM)
- Nirnay (Q)
- NTPC Technical Journal (2-Y)
- Nucleic Acids Research (BM)
- Nucleus (Q)
- OAPEC Bulletin (BM)
- OCLC Newsletter
- Oil and Gas Journal (W)
- Oil Asia Jonrral (Q)
- OPEC Bulletin (Q)
- OPEC Review (Q)
- Options (Q)
- Our Planet : The Magazine of the UNEP (Q)

- Oxford Energy Forum (Q)
- Ozone Action (Q)
- P C Computing (M)
- P C Magazine (M)
- P C Quest (M)
- P C Week Asia (W)
- Pacific and Asian Journal of Energy (2-Y)
- Panchayati Raj Update (Q)
- Panorama · Priority Programme Environment (Q)
- Parivesh Newsletter (Q)
- Paryavaran Abstracts (Q)
- PETC Review (Q)
- Photovoltaic Insiders Report (M)
- Phytopathology (M)
- Pipeline (Q)
- Plant Breeding (BM)
- Plant Cell Reports (M)
- Plant Cell Tissue and Organ Culture (M)
- Plant Cell, The (M)
- Plant Journal, The (M)
- Plant Molecular Biology Reporter (Q)
- Plant Molecular Biology (8-Y)
- Plant Physiology (M)
- Pollution Equipment News (Q)
- Power (M)
- Power Engineering (M)
- Powerline (BM)
- Power Technology International (Q)
- Power Engineering International (Q)
- Printing Times (BM)
- Prisma (Q)
- Proceedings of the National Academy of Sciences of USA (BM)
- Process and Plant Engineering (Q)
- Productivity (Q)
- Progress in Photovoltaics (BM)
- Public Enterprise (Q)
- PV News (M)
- Quarterly Operational Report (Q)
- Rapa Bulletin (Q)
- Regional Energy News (Q)
- Renewable Energy (M)
- Renewable Energy for Development (Q)
- RERIC International Energy Journal (2-Y)
- RERIC News (Q)
- Resources (Q)
- Resources and Energy Economics (Q)
- Resources Conservation and Recycling (M)
- Review : The Quarterly Journal of Renewable Energy (Q)
- Review of Economics and Statistics (Q)
- Revue De l'Institut Francais Du Pe'Trole (Q)
- Rice Biotechnology Quarterly (Q)
- Rural Technology Journal (Q)
- Sadhana (BM)
- Sarvekshana (Q)
- Scavenger (Q)
- Science (W)

- Science of the Total Environment (36-Y)
- Science for Village (M)
- Science Update (M)
- Sciences, The (BM)
- Scientia Horticulture (M)
- Scientific American (M)
- SEI: International Environmental Bulletin (Q)
- Selected Rand Abstracts (Q)
- Semi-Arid Tropics News (2-Y)
- SESI Journal (2-Y)
- SESI Newsletter (2-Y)
- Social Change (Q)
- SAE Transactions: Jr. of Passenger Cars (2-Y)
- SAE Transactions: Jr of Fuels and Lubricants (Y)
- SAE Transactions: Journal of Aerospace (Y)
- SAE Transactions. Journal of Engineers (Y)
- SAE Transactions: Journal of Commercial Vehicles (Y)
- SAE Transactions: Journal of Materials & Manufacturing
- Software Today (M)
- Solar Cooker Reviews (Q)
- Solar Energy (M)
- Solar Energy Materials and Solar Cells (M)
- South Asian Cooperation in Energy & Environment (3/Y)
- South Letter (3/Y)
- South Link (3/Y)
- Spectrum : British Science News (Q)
- SPLASH Bulletin: A Special erdeavour for the Advancement of Small Hydro (Q)
- Srishti (Q)
- Strategic Planning for Energy and the Environment (Q)
- Sun Power: A Quarterly Energy Digest
- Sun World (Q)
- Sustainable Agricultural News (Q)
- Sustainable Development (3-Y)
- Sustainable Development Research Institute Newsletter (Q)
- Sustainable Energy News (Q)
- Telematics India (M)
- TERI Newswire (SM)
- TEU Newsletter (Q)
- Thai Abstracts : Science and Technology (Q)
- Theoretical and Applied Genetics (18-Y)
- TIDE:TERI Information Digest on Energy (Q)
- TIEMPO
- Time
- TIMES: TERI Information Monitor on Environmental Sciences (2-Y)
- TISGLOW: TERI Information Service on Global Warming (2-Y)
- Tomorrow: The Global Environment Magazine (Q)
- Trade & Environment (Q)
- Transportation Research : Part A - Policy and Practice (BM)
- Transportation Research . Part B - Methodological (BM)
- Transportation Research : Part C - Emerging Technologies (BM)

- Transportation Research : Part D - Transport & Environment (Q)
- Trends in Biochemical Sciences (M)
- Trends in Biotechnology (M)
- Trends in Ecology and Evolution (M)
- Trends in Genetics (M)
- Trends In Plant Science (M)
- Tropical Agriculture (Q)
- Tropical Forest Management Update (Q)
- Unasylva (Q)
- UNEP Asia Pacific Newsletter (Q)
- UNIDO Newsletter (Q)
- Unisist Newsletter (Q)
- Urban Age (Q)
- Urban Links (Q)
- Urja Patra : GEDA File (Q)
- Utilities Policy (Q)
- Utility Automation (Q)
- Van Vigyan (Q)
- Verbatim : The Languages Quarterly (Q)
- Vidyut Bharati (Q)
- Vikalpa (Q)
- Voice & Data (Q)
- Warmer Bulletin (Q)
- Wastelands News (Q)
- Water and Energy International (Q)
- Water Research (M)
- Water Science & Technology (SM)
- Way Ahead: Pakistan's Environment & Development (Q)
- Wind Engineering (BM)
- Wind Power Monthly (M)
- Wood Energy News (Q)
- Wood Research (Y)
- World Agriculture Economics & Rural Sociology Abstracts (BM)
- World Bank Economic Review, The (3-Y)
- World Bank Policy Research Bulletin (BM)
- World Bank Research Observer, The (2-Y)
- World Cement (M)
- World Climate News (2-Y)
- World Coal (M)
- World Development (M)
- World Energy Conference Journal (2-Y)
- World Journal of Microbiology and Biotechnology (M)
- World Link (M)
- Worldwatch Papers and Books (BM)
- Yojana (English) (M)

Role of newspaper clipping services

News abstracting/briefing services

TERI Newswire
- Published by TERI
- Fortnightly
- News on economy, energy, and environment

The Environment Digest
- Published by Environmental Publications Ltd, UK
- Ten issues per year
- News on environment, energy, economy, agriculture, . 13 topics

Asian Energy News
- Published by Asian Institute of Technology, Bangkok
- Monthly
- News on energy — countrywise

Electronic based news briefs services

India Business Insight
- Prepared by Sprint RPG India Ltd
- Updated daily
- News on all sectors of the Indian economy, available in 50 categories

India Connect
- Maintained by Panalink Internet Services
- Updated daily
- News on business and finance, politics, and international

India Daily
- Maintained by Systems and Software, a division of Integratise Inc.
- Updated every six hours
- News on all sectors of the Indian economy

Various consultancies and agencies like the Business and News Information Pvt Ltd. and Sankalp Consultancies compile newspaper articles and deliver these daily

Press clipping services

India Greenfile
South Asia Greenfile
Global Greenfile

- Published by the Centre for Science and Environment, New Delhi
- Monthly
- Executive summary of news of the month
- News items on environment (land, health, people, science, energy 16 topics)

Archival databases

Internet archival

Leading newspapers are available on the Internet Electronic libraries, like the Electric Library of Infonautics Corporation, contains newspaper articles from newspapers which can be retrieved based on the pattern of classification used

Microfilms

Many libraries and information centres like the US Information Centre, the British Council, and media libraries store newspaper articles on microfilms

CD-ROMs and MO disks

Clippings can be stored in CD-ROMs or magnetic optical (MO) disks after scanning

Press clipping management softwares

ClipScan (for Microsoft Windows)

The package is offered by SpinWARE, Miami
Scans press clippings, imports clippings downloaded from any online information source, and indexes each news clipping on every word Views and prints the clippings as it appears in the publication

Similar softwares, like Newgen Clipping Management System, have been developed in India.

Micro CDS/ISIS

Package developed by UNESCO

TERI Newswire

Scope:

Keeps the readers abreast of the up-to-date scenario in the fields of economy, energy, and environment

Information gleaned from several newspapers which include national and major metropolitan dailies as well as regional newspapers

Time-bound production schedule

Simultaneous production and despatch from the US affiliate of TERI to the overseas subscribers

Constant interaction with the readers; in response to many of its readers, two recent sections, *Feature* and *Perspective*, have been added

Each issue contains 85-90 news items

The database facilitates easy storage and retrieval

Contents:

Editorial
Feature — analytical article focussing on a topical issue
Perspective — in-depth statistical analysis, every quarter
Forthcoming events
News on economy, energy, and environment

Coverage:

Economy

Energy
- Coal
- Oil & Gas
- Power
- Renewable Energy

Environment
- Biodiversity
- Climate change
- Forestry
- Pollution
- Waste Management
- Wasteland Development
- Water Resources
- Wetlands

International

Database software:

Software used: micro CDS/ISIS
The database contains news items from July 1993

Each record contains the title of the news item, correspondent/news bureau, source (name of the newspaper), date, news brief, and keywords, apart from the abstract

Each news item is indexed by keywords which give the answers to the following questions.
what is the issue(s) concerned;
where has the news occurred; and
date of the press clipping.

For instance,

1205 families to benefit from piped natural gas, *The Times of India,* 15 February 1997

what → Oil & gas, energy
where → New Delhi
date → 19970215

We can also locate the news using search criteria including words contained in the headline of the news item.

The database is available on the Local Area Network (LAN) and is updated every fortnight

LIBSYS : A Solution for Library Automation and Networking

(Presented by Antony Jose, Regional Coordinator (CSG),
LIBSYS Corporation, New Delhi)

1. INTRODUCTION

Today we are witnessing an enthusiasm among librarians / Information professionals to observe and adapt to changes in technology affecting the collection, organisation and dissemination of information. Computer based retrieval system and online catalogues have been accepted as essential in a modern library. Today changes in computer and information technology arrive faster and faster. So it is technical changes that will shape the information environment and the library in the 21st century.

The success of a library / information system largely depends on how well it can retrieve information in order to disseminate it to the users. The advent of computers play an important role in the acquisition, storage, retrieval and dissemination of information. The selection of right S/w is the most important step in library automation. Some of the points to be considered while selecting the S/w are :

- Simplicity in use
- User base
- Regional applicability
- Networking capabilities
- Local support
- Whether continuous researches and development is going on and new version are added periodically.

2. LIBSYS

LIBSYS is a fully integrated multi-user library system designed to run on a wide spectrum of hardware / Software platforms. It caters for all the activities related to Acquisition, cataloguing circulation, serials and OPAC. LIBSYS takes care of even small activities to provide completeness in automated operation. LIBSYS is highly user friendly having features such as integrated functions interaction and screen oriented, menu driven multi-user capabilities, minimum possible data entry, powerful data editing facility, user defined security, help facility, etc.

LIBSYS have over 400 sites since its inception in 1988 which includes universities, scientific laboratories, public libraries, corporate and government organisation. The BCL's all over South Asia have adopted LIBSYS The Spanish version of LIBSYS is adopted at a national university of Central America.

LIBSYS is built around its own centralised bibliographic database based on ANSI Z39 50 format ANSI Z39.50 is the most popular bibliographic standard for bibliographic exchange

3. OPERATING PLATFORMS

LIBSYS could be installed on following platforms · -

SERVER

a) UNIX : SCO UNIX / SOLARIS / UNIXWARE for Intel 486/PENTIUM,
OSF/1 for ALPHA (Digitals),
HP-UX on HP-9000; or
AIX on RS/6000 (IBM))
SOLARIS 2.4 on SUN SPARC
IRIX on Silicon Graphics INDY

b) NOVELL Netware

c) WINDOWS NT . Intel PENTIUM
or
ALPHA (Digitals)

CLIENTS / NODES

a) WINDOWS'95 / 3 x
b) WINDOWS NT
c) UNIX work station

4. CLIENT-SERVER MODEL

LIBSYS is available for installation both as stand alone on MS Windows and multi-user on a LAN. In multi-user both Host version as well as Client-Server implemenatation is possible

LIBSYS on Client-Server version has the following advantages over the host version ·

(a) Provides GUI (Graphic User Interface) at clients (MS WINDOWS / X-WINDOWS) thus making possible use of mouse and other features of WINDOWS such as scroll bars etc.

(b) Would have reduced traffic on LAN.

(c) Improved throughput as processing is distributed between Server and Clients.

(d) Most suitable for networking (ANSI Z 39.50 compliance)

(e) World wide accepted state-of-the-art technology model

(f) No TCP/IP S/w such as LAN WORKPLACE required at Client/nodes; The basic UNIX or WINDOWS NT server for 5/10 users adequate for use by unlimited no of users in Client-Server environment - Thus significant cost saving

5. NEXT RELEASE OF LIBSYS

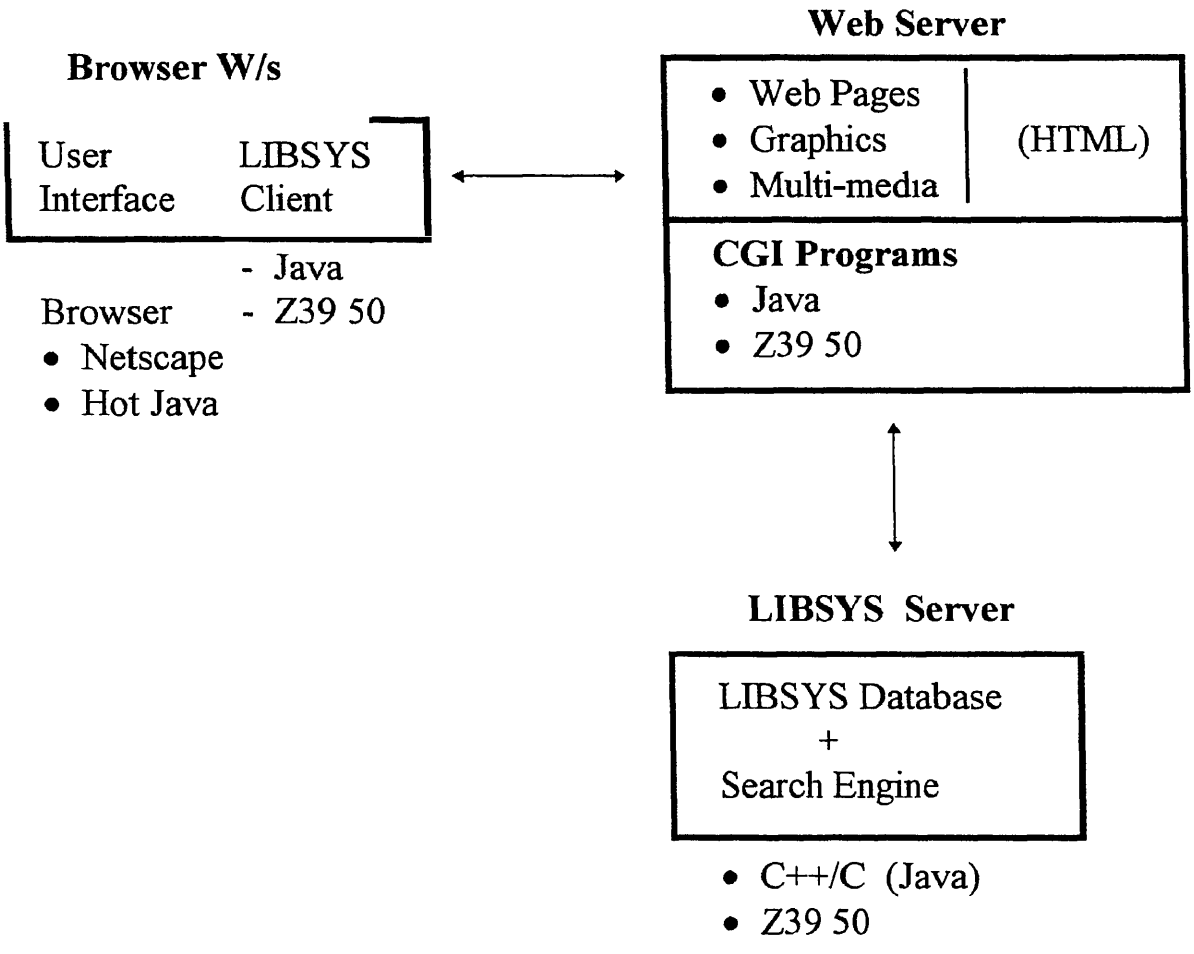
The LIBSYS 3 1 release of LIBSYS has following additional features -

- Maintaining authority files for subjects/keywords, authors, and publishers, Controlling data entry w.r t authority files, Cut and paste facilities to include these in title records, Option to update authority files independently or automatically by new entries in input titles
- User defined synonyms with their automatic pickup by search engine.
- Facility for global changes in the Bibliographic database
- Bigger area (14 row 70 columns) to display details of a document thus avoiding multiple screens/cards for a document
- Switching over to 'Modify Title' or 'Remove Title' function for a selected title while in 'Searching' or 'Bibliography' of Cataloguing System
- In KWIC (Words in Title), the list option now shows words from 'Titles' only, Option for display similar to title Catalogue.
- Thesaurus (BT, NT, RT) interface
- Additional functions in ILL· to generate Request 1st time for title and ILL, to generate reminder for pending ILL request; to register item received under ILL, allow checking-out of only those ILL items registered as 'Received' etc.
- Hourly circulation statistics cover 24 hours a day.
- Modified holiday calendar definition

- Option to view 'Print File' priór to printing/saving on disk
- Checking-out on hourly basis including fine calculations (for special collections).
- Improved indexing (ignoring of special/punctuation characters in various Catalogues)
- Totally revamped Serials system giving additional flexibility in subscription control.

6. FUTURE DEVELOPMENTS

➢ Internet Gateway



➢ Imaging Capabilities
➢ Multi-media

Important printed abstracting services in the field of energy and environment

Abstracting journals published by TERI

1 *ASSET (Abstracts of Selected Solar Energy Technology)*
- Quarterly
- Abstracts of articles on solar and other renewable energy technologies with particular emphasis on information applicable to rural communities in the developing world
- Select article, bibliography, calendar of events, book reviews, newsbriefs, etc
- Taken from documents available in TERI Library as well as outside sources
- Annual indexing

2 *TIDE (TERI Information Digest on Energy)*
- Quarterly
- Abstracts on 13 topics of conventional and non-conventional energy
- Review article, bibliography, newsbriefs, statistical capsule, etc.
- Literature from India and other SAARC countries
- Author and subject indexes

3 *TIMES (TERI Information Monitor on Environmental Science)*
- Biannual
- Abstracts on 14 topics, review article, bibliography, newsbriefs, book reviews
- Literature from India on different environmental issues

4 *TISGLOW (TERI Information Service on Global Warming)*
- Biannual
- Latest developments in the subject of global warming and climate change
- Abstracts on 11 topics, select article, bibliography, newsbriefs, calendar of events

Other abstracting journals:

1 *Abstracts of AIT Reports and Publications on Energy*[*]
- Annual; published by RERIC (Regional Energy Resources Information Centre, Bangkok)
- Disseminates information about documents from research carried out at AIT in energy, its rational use, and renewable energy resources
- Covers theses, research reports, conference proceedings, periodical articles
- Keyword and author indexes

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[*] Affiliations of authors not provided

2 *CA Selects Plus Environmental Pollution*

- Fortnightly by Chemical Abstracts Service of American Chemical Society, USA
- Topics covered: Soil pollution, water pollution, air pollution, other pollution
- News briefs and announcements
- No index

3 *CAB Abstracts Forestry Abstracts*

- Monthly; published by CAB International, UK
- Derived form bibliographic databases developed by CABI staff
- Providing SDI service (TERI/MIC receives one on Mycorrhiza)
- Author and subject index

4 *Current Literature on Science of Science*

- Monthly, published by National Institute of Science, Technology, and Development Studies, New Delhi
- Abstracts cover general science topics as well as energy and environment R&D
- Reviews and digests
- Author and subject indexes

5 *Energy Abstracts (The Engineering Index)*

- Monthly, published by Engineering Information, Inc (Ei), USA
- Items also appear in COMPENDEX or the COMPuterized ENgineering InDEX, one of Ei's machine readable databases
- Topics covered· coal; petroleum; natural gas; nuclear energy, all types of renewable energy technologies, energy management and policy; energy conversion, energy conservation, consumption, and utilization, environmental and social aspects, etc.
- Provided with an author index and a very comprehensive subject index. A special feature is the author affiliation index

6 *Environment**

- Quarterly, published by British Council Library, Calcutta
- Topics covered biodiversity; conservation; environmental education, health, law, management, and planning; global warming, pollution
- Britain-based literature
- Documents include books, periodicals, conference proceedings, news and views
- Subject index

7 *Fuel and Energy Abstracts**

- Bimonthly; brought out by Institute of Energy, London
- World literature on all technical, scientific, commercial, and environmental aspects of fuel and energy
- Subject and author index

8 *Indian Science Abstracts (ISA)*
- Semi-monthly; published by INSDOC, New Delhi
- Abstracts of original scientific research work published in Indian journals, also patents and standards (no popular articles)
- Subject and keyword indexes

9 *International Development Abstracts**
- 6/y, published by Elsevier/Geo abstracts, UK
- Covers development aspects of agriculture, environment, policy issues, tourism, gender issues, education, health, etc One entire section on Environment and Development
- Developing and newly industrialized countries
- Subject and regional indexes

10 *Paryavaran Abstracts*
- Quarterly, published by ENVIS, Ministry of Environment and Forests, New Delhi
- Topics covered. air, water, noise pollution; ecology and conservation; health and toxicology, wastes, forests and environment; energy and environment
- Literature from India
- Author and keyword indexes

11 *Wind Engineering Abstracts*
- Quarterly, published by Multi-Science Publishing Co, UK
- Summarizes and classifies periodical literature on wind energy from world's major journals
- Topics covered Meteorology, Geography, Topography, aerodynamics, design; wind power generation and transmission, machine subsystems and components; instrumentation and control, economic, environmental, and legal aspects
- Annual author and subject index

International Abstracting Services

Chemical Abstracts (CA) is published by the American Chemical Society and is a comprehensive key to the world's chemical literature. CA is a weekly journal, containing abstracts of documents relevant to chemistry, chemical engineering, and allied disciplines. CA is available in five groupings (total 80 sections). Abstracts on biochemistry and organic chemistry are published one week and the rest are published the following week

In the Applied Chemistry and Chemical Engineering group there are 18 sections (47 to 64); the 52nd section relates to **electro-chemical, radiational and thermal energy technology** This section covers chemical and chemical engineering aspects of non-fossil energy sources, energy conversion devices and their components, and energy storage, recovery and use of waste heat, production of fuels from biomass and organic wastes by fermentation and gasification; and safety aspects of energy utilization

The 59th and 60th sections deal with environment (**Air pollution and Industrial Hygiene, Waste treatment and disposal**) This section covers the presence of polluting materials in air and the reactions of these materials with each other and with naturally occurring substances. Indoor air pollution is included here. Methods for removal of pollutants from air and from emissions prior to release are included, except for prevention of auto exhaust pollutant formation by fuel alteration or engine modification Method for determination of pollutants in air are covered in this section Industrial safety studies in both chemical and nonchemical industries are included in this section, except for controlled studies of pollutant toxicity Each issue of CA has three indexes, namely author, key-word, and patent

Excerpta Medica (EM) is published by Elsevier Science publishers, the Netherlands, since 1940 Forty three individual specialty abstract journals and two drug-related literature indexes are issued ten to thirty times per year Each abstract journal, called a section, covers a particular specialty Together they cover the whole field of human medicine and related disciplines. Three sections go considerably beyond the scope of biomedicine, namely, Health economics and hospital management, Environmental health and pollution control, and Drug dependence EM abstracts articles from over 3500 biomedical, pharmaceutical and chemical journals, covering the most significant published papers in the field of biomedicine from all over the world Each abstract journal issue contains author and subject indexes Cumulative indexes are normally provided for each volume Each section of EM database (EMBASE) has its own hierarchic classification system with a maximum of four levels of sub-divisions within the section, called EMCLASS.

Topics covered include : chemical pollution and its effect on man, animals, plants, and microorganisms; environmental impact of chemical pollution; waste water treatment and measurement; meteorological aspects of pollution; pharmaceutical toxicology; chemical teratogens, mutagenes, and carcinogens.

Energy Abstracts (EA) is a specialized monthly publication of the Engineering Information, USA. EA covers world's technological literature in all engineering disciplines in the broad field of energy The abstracts in each issue are arranged according to subject headings. Environmental related literature is mainly organized in the following four sections: Environmental sciences· atmospheric, Environmental sciences: terrestrial, Environmental sciences aquatic, Environmental-social aspects of energy technologies. Each issue of EA carries 3 indexes, namely author, author-affiliation, and subject

Fuel and Energy Abstracts (FEA) is an international journal published by the Institute of Energy, London FEA is a bi-monthly and includes literature from all over the world on all technical, scientific, commercial and environmental aspects of fuel and energy. The abstracts in each issue are arranged in classified sections. Section 15 is on environment and cover papers on pollution, health protection, and safety. Each issue contains an author and a subject index.

TERI

Workshop on

Information Handling and Dissemination in
Energy and Environment

Design and Development of Bibliographic Database CDS/ISIS)

March 5-7, 1997

1 INTRODUCTION

CDS/ISIS stands for computerised documentation systems/integrated Set of Information Systems It is a completely menu driven generalised information storage and retrieval systems and it allows one to build and manage structured non-numerical databases, i e databases, whose major constituent is text It is first developed and distributed by UNESCO in 1985 The present virsion is 3 07

Hardware requirements

The minimum hardware requirements for running CDS/ISIS are the following:

IBM-PC/XT/AT or compatible

512 K RAM memory (640 K recommended)
1 floppy disk unit
1 harddisk
1 (monochrome or colour) screen
1 printer

System restrictions

The following systems restriction are currently, in effect.

Maximum number of databases	unlimited
Maximum number of records in a database	16 millions (within the limit of 500 Mb)
Maximum record size	8000 characters
Maximum number of fields	200
Maximum number of field size	8000 characters
Maximum number of fields on a worksheet page	19
Maximum number of pages in a worksheet	20
Maximum size of a display format	4000 characters
Maximum number of stopwords	799

System functions

The major functions provided by CDS/ISIS allow you to

- Define databases containing the requirement data elements
- Enter new records in to a given database
- Modify, correct and delete existing records
- Retrieve records by contents, through sophisticated search language
- Display records or portions according to your requirements
- Sort the records in any sequence desired
- Print partial or full catalogues/indexes.

These facilities are provided through a set of 8 major services, classified in two broad categories·

User services (data entry, editing, information retrieval, printing of catalogue/ index etc)

System services (New database creation or modification of existing one, system utility functions etc)

Database definition/creation

Before access a database, you have to create a database definition using ISIS DEF services:

A CDS/ISIS database definition consisted FDT, FMT, PFT & FST

FDT (Field definition Table) defines the fields which may be present in the records of database and their characteristics.

FMT (Data Entry Worksheets) - the screen layouts used to create/or update the records of the database.

PFT (Display/print format) - there should be a display/print format for either on line display of records during searching or for generation of printed output (catalogue/index)

FST (Field Select Tables) - FST defines the fields of database to be made searchables through inverted file

2 INSTALLATION OF SOFTWARE

System parameter files - SYSPAR PAR

The system file SYSPAR PAR contains system setup parameters. It is read each time CDS/ISIS is activated. When CDS/ISIS starts it first looks for the file SYSPAR PAR in the current directory This file can be prepared with an editor. (e.g edit or edting) has the following format:

IBM PC ---->

SYSPAR PAR

```
1=C \isis\prog\
2=c \isis\menu\
3=c.\isis\msg\
4=c \isis\
5=c \isis\data
7=E
0=! password ...
```

TERI (Password)

```
4=c:\isis\TERI\work\
5=c:\isis\TERI\data\
6=TERI
```

BIB

```
4=c:\isis\bib\work\
5=c:\isis\bib\data\
```

In this case each time CDS/ISIS is started it will first read SYSPAR.PAR and set the systems, menu and message paths and select English language. Then if the response to this prompt is TERI, CDS/ISIS reads this file (TERI) and sets the remaining parameters for Bibliographical database.

Installing CDS/ISIS in your computer

An installation program ISISINST is provided with the software The program will guide you through the installation procedure

Manual institution

a Setting up directories

All though you may load all CDS/ISIS files in the same directory. For best performance and convenience of use, it should be install separate directories as follows:

To create the CDS/ISIS directories, type the following, at the DOS prompt

MD\ISIS - create main CDS/ISIS directory
CD\ISIS - change and go to ISIS directory
MD SYS - create subdirectory for system/program
MD MENU - create subdirectory for menus
MD MSG - create subdirectory for message files
MD DATA - create subdirectory for user database files

MD PROG - create subdirectory for user programs
MD WORD - create subdirectory for user workfiles

b Load Install.bat on the hard disk

There is file called INSTALL.BAT in diskette (CDS/ISIS software). This file must be copied to hard disk before you run it.

Mount the ISIS01 diskette on drive a: and type CD\ISIS

```
CD\ISIS
      └──── enter
COPY A:INSTALL.BAT
                  └──── enter
```

c Run Install

To run install type

```
INSTALL \ISIS\SYS \ISIS\MENU \ISIS\MSG \ISIS\DATA   \ISIS\PROG
```

d. Establish a path to the ISIS programme

You must establish and access path to this subdirectory, so that DOS will be able to find the micro/isis.

To edit the file Autoexec.bat in the root directoy Type as
edit Autoexec.bat

path should be c:\isis\sys

e Configuration requirements

Config sys file should exist with
BUFFERS = 24
FILES = 24
Now installation of CDS\ISIS to your computer is over.

3 CREATION OF DATABASE

The creation of a database starts with a detailed study of the objectives, source documents, information requirements and output formats The objective of a bibliographic databasis generally include documentation of all the available literature on specific subjects, its dissemination and providing SDI services. The source documents are both. journals, conference proceedings and other documents Retrieval is usually required by subjects, authors and other parameters.

Let us consider how a bibliographical database create:

1 Title - Unique name field
2 Author(s) - Since there could be more than one author for a book, it is generally treated as a repeatable field.
3 Imprint - This could be publisher's name, place of publication and year of publication. Thus this field can have three subfields.

3 1 Steps for creating a database

1 Activate ISIS --> type ISIS └——> enter
2. Activate database definition services from main menu and name the database.
3 Setting up FDT
4 Preparing worksheet for on line data entry or input
5 Specifying display format
6 Establishing a FST (specifying the indexing parameters)

The task at establishing the FDT, FMT, PFT and FST are to be completed one after other at one sitting.

A sample FDT may be given in Fig. 1:

Field Definition Table (FDT) Database· BIB

?	Tag	Name	Len	Type	Rep	Delimiters/Pattern
	10	Title	200	X		
	20	Author	150	X	R	
	30	Imprint	550	X		npd

Fig. 1

Each field has a unique field address number known as Tag, a name, maximum length, attribute/characteristics, type, repeatability or subfield identifiers/pattern.

TAG: It is numerical, Range 1 - 32767 & it can 5, 15, 115, 999

NAME: Descriptive name of not more than 30 characters.
Example - Title, Author(s)

LEN: a number in the range 1 - 1650 indicating the expected length of the field.

TYPE Indicating, type of characters that will be used in the text of fields, e g Alphebatic(A), Numerica(N) or Alphanumeric(X) and Pattern(P)

REP(R) Indication of whether the elements in a field will occur more than once in the same field

Delemeters/Pattern: If the field contain subfields the selected subfield identifies are defined here

3 2 Procedure for creating a FDT

When the name of database is given the following screen will appear:

Field Definition Table (FDT) Database: BIB

?	Tag	Name	Len	Type	Rep	Delimiters/Pattern

Enter Field TAG or <CR> to exit
EDIT Replace

Fig. 2

Then enter as:

10 : to tag column
<CR> : to move to the name column
Title : field name
<CR> : to move to 'Len' column
200 : maximum field length
<CR> : to move 'Type' column
X : field 'Type'
<CR> : to show the field is not repeatable
<CR> : to move to Delimınters/Pattern column
<CR> : to terminate the entry.

At this point your screen should look like as in Fig. 3

Field Definition Table (FDT) Database: BIB

?	Tag	Name	Len	Type	Rep	Delimiters/Pattern
	10	Title	200	X		

* (Cursor)

Enter Field TAG or <CR> to exit
EDIT Replace

Fig. 3

Now complete the entries for all the fields as above The sequence of keys for the FDT of BIB would be

20 <CR> Author <CR> 150 <CR> X R <CR> <CR>
30 <CR> Imprint <CR> 300 <CR> <CR> npd

At this point your screen should look as follows:

Field Definition Table (FDT) Database BIB

?	Tag	Name	Len	Type	Rep	Delimiters/Pattern
	10	Title	200	X		
	20	Author	150	X	R	
	30	Imprint	550	X		npd

* (Cursor)

Enter Field TAG or <CR> to exit
EDIT Replace

Fig. 4

By pressing <CR>, the following sub menu to be displayed in the message area

<CR> Next page M - Modify, C - Cancel, X - exit

Now, Type X to save the FDT

ISIS will now save your FDT and calls the worksheet editor

Data Entry Worksheet: The worksheet is used for adding or updating entries in a database The ISIS provide a blank screen on which the user can design the worksheet

3.2 1 Parameters for each field

Field Tag : Possible answers are

T	indicating that it is a title field
N	Numeric value indicating the tag number as defined in FDT or
?	to display the tag and name of each field you want to select on the worksheet. To select enter S or <CR> to go next field or <TAB> to go previous field

Name Position·	Indicate the screen coordinate L/C (Line/Column) where you want to bring the title of the field on the screen.
Value Position	Indicate the screen coordinate where you want to start the data entry part in the screen later.
Field attribute:	Defines the screen attribute of the field value component System gives a choice of 6 attributes. The attributes are

0 - Normal
Field value is displayed as the field name
1 - Reverse of attribute 0
2 - Bold
High density, brighter than field name
3 - Underlined
Normal density
4 - Blinking
Field value will be blinking
5 - Invisible
Field value will not be displayed

Field length	<CR> to accept the length indicated in FDT One can indicate the length in number of lines also i.e. L4 or a scrolling (for repeatable field) by defining the window size say S3. When defining the length as scrolling you can exceed maximum field length defined in the FDT
Help message	You may associate with each field of worksheet a HELP message Help message would normally contain guidelines for entering data in the field

	and additional explanations on its contents. This will be displayed at the time of data entry by pressing "F1" key.
Default value	To give a default value for those fields whose contents will be the same for a majority of records

3 3 **Procedures to create a data Entry Worksheet**

To create a worksheet, follow the steps given below

At this point the screen will be as follows

```



Enter field Tag
                                                  BIB/1
```

Fig. 5

The prompt `Enter field Tag' in the message area indicates that ISIS expects you to enter the tag of the field to put on the worksheet

Type as

```
Prompt  --> 'Enter field tag'          10 <CR>
Prompt --> Enter L/C Position of the field name
                  Next available position   1/1
```

Now you have two choices·
- accept the porposal by just pressing <CR>
- enter a new position, e g 1/3 (Line 1, Column 3) or 3/1 (line 3, Column 1)

Let us accept Micro-ISIS's proposal by pressing <CR>

At this point your screen will be as follows.

```
Title



EDIT   Replace
                                                BIB/1
```

Fig. 6

You are given here the opportunity of modifying the field name if you so wish and then enter <CR>

Prompt:	Enter L/C position of the field value Next available position 1/6
Enter	1/20 <CR> (if you want to place value component in column 20 of line 1)
Prompt:	Define field attributes (0 - Normal, 1-Reserve, 2-Bold, 3-Underline, 4-Blinking, 5-Invisible)

Let us use "Reverse Video", Type '1'

Prompt --> Enter field Length (200)

Value indicated in parenthesis (200) corresponds to the maximum field length defined in FDT and your response can be

L2	2 lines limit
S3	2 lines & scrolling upto 200 characters
<CR>	to accept maximum field length defined in FDT

Let us accept it by pressing <CR>

Prompt --> Enter Help message for this field
(Here you provide help message for the field for the data entry operator Data entry operator may later call up this message by using <F1> key).

We do not have help message for title filed. Type <CR>

At this point you may to enter a default value for the field. As the value of this field (title) will be different each time, providing a default value in this case, will not be useful

Type: <CR>

Now all the parameters required for first field have bee supplied ISIS now restarts from the beginning and prompts you to enter the tag of the next field Repeat the above steps for all the fields

At the end, your screen should look like this.

```
----------------------------------------------------------------------------------

Title          ---------------------------------------------------
----------------------------------------------------------------
-----------------------------------
Author              ---------------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------
Publisher's Name    ---------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------


                                                                   BIB/1
----------------------------------------------------------------------------------
```

Fig. 7

The sequence of key strokes you should have used to create the above screen is the following (assuming you have entered no help message or default value)

FIELD	**KEYSTROKES**
Title	10<CR>1/3<CR><CR>1/25<CR>200<CR><CR><CR>
Author	20<CR>4/3<CR><CR>4/25<CR>S2<CR><CR><CR>
Imprint	30<CR>6/3<CR><CR>6/25<CR>S3<CR><CR><CR>

[Help messages for field 20 (Author) could be Repeatble, please enter "Surname, Forename%Surname, Forename e g Kar, D C%Verma, A K]

Help messages for field 30 Imprint could be ^nName of Publisher^pPlace of Publication^dDate of Publication e g ^aElsevier Science^pOxford^d1996

After the last field ISIS prompts you again to define the next field. Reply <CR> to tell ISIS that you have no more fields to enter in the worksheet.

Let us now save the worksheet Type 'S'

3 4 Default Display Format

The next component of our database definition is the default display format. Therefore, ISIS now prompts you to enter it by displaying a blank screen as given in Fig 8

Database Name : BIB FORMAT Name BIB

---

* Cursor

EDIT Replace

Fig. 8

Following aspects have to be carefully considered for giving the specific details for displaying/printing the contents of each field.

* Identify/Select the fields whose contents are to be displayed.

* Determine the sequence in which the fields are to be displayed

* Determine the spacing between the successive fields

* Determine the spacing & punctuation between fields and between subfields wherever relevant

Example Let us decide that we have to display the author, title, publication and the record number. Here we will give the format as

MFN, V20/V10/V30

MFN - to display the Master File number (Rec No)

V20 - tag of the variable (V) field Author

V10 - tag of the variable (V) field title

V30 - tag of the variable (V) field Publication

/ - shows each field has to be in a new line

Type MFN, V20/V10/V30

EFFECT · The screen will appear as

Database Name · BIB FORMAT Name BIB

MFN, V20/V10/V30

EDIT. Replace

Enter <CR>

Fig. 9

3 5 **Field Select Table**

The last component of the database definition is to set up a fast access file called inverted file to facilitate quick search and retrieval of records from a database We do it through a table called Field Select Table (FST). For each FST, we have to give the following three parameters:

- Identification Number (ID)
- Indexing Technique (IT)
- Extraction Format

While exiting from the display specification stage after pressing <CR> the system moves to the FST specification stage and displays the following screen:

Database Name . BIB FST for inverted file FST Name . BIB

ID	IT	Data extraction format

Fig. 10

Try now to set up an FST to make fields title (tag 10) and name of publisher (tag v30^n) searchable

```
TYPE        10    4     V10
            20    0     V30^n
```

Contents of tag number 10 will be indexed using indexing technique 4 and the output will be given an identification number 10 And contents of the subfield 'name of publisher' will be indexed using indexing technique 0 and given an identification number 20 The screen will be displayed as in Fig 11

Database Name · BIB FST for inverted file FST Name BIB

ID	IT	Data extraction format
10	4	V10
20	0	V30^n

Fig. 11

(details and technique will discuss later on)

Type <CR>
ISIS creates all the necessary data files and then returns to the menu EXDEF
Select option X or press F2 to return back to the main menu.

At this point your database is ready for data entry. Now you may try to enter a few sample records using the E option of the main menu.

4 PRACTICE

The data elements of CATALOG, Database are given below We may now create a database for practical purpose

Tag	Field Name
1	Name
2	Institute
3	Address
4	City
5	Country

4 1 Field Definition Table (FDT)

Now complete the entries using the following items

The sequence of keys would be

1<CR> Name <CR> 100 <CR> x <CR> <CR>
2<CR> Institute <CR> 100 <CR> <CR> <CR>

3<CR> Address <CR> 200 <CR> AR <CR>
4<CR> City <CR> 50 <CR> X (CR> <CR>
5<CR> Country (m) <CR> 500 <CR> <CR> <CR>

At this point your screen should look as follows

Field Definition Table (FDT) Database · HRD

?	Tag	Name	Len	Typ	Rep	Delimiters/pattern
	1	Name		100	X	
	2	Institute		100	X	
	3	Address		200	X	X
	4	City		50	X	
	5	Country		50	X	X

Fig. 12

4 2 **Worksheet**

FMT --> The sequence of keystorkes you should have used to create the above screen is the following (assuming you have entered no HELP message or default value)

FIELD	KEYSTORKES
Name	1<CR>2/1<CR><CR>2/20<CR>L1<CR><CR><CR>
Institute	2<CR>4/1<CR><CR>4/20<CR>11<CR><CR><CR>
Address	3<CR>6/1<CR><CR>6/20<CR>52<CR><CR><CR>
City	4<CR>8/1<CR><CR>8/20<CR>50<CR><CR><CR>
Country	5<CR>10/1<CR><CR>10/20<CR>50<CR><CR><CR>

4 3 **Print Format**

PFT --> The next component is the default display format - a sample format such as· MFN(n)/MDL, C11, "V1/V2¦/V4/V5

For printing master fine number	i e MFN
Name	i e V1
Institite	i e V2
City	i e V4
Country	i e V5

(Details in next session)

4 4 **Field Select Table**

FST --> The last component of the database definition is to set up FST for specifying fields and indexing techniques for the database.

Try now to set up an FST to make fields 200, 202, 6 & 9 searchable The screen is look like

ID	IT	Date extraction format
1	0	V1
2	0	V2
4	0	MHL, (V4)
5	0	MHL, (V5)

5 FORMATTING LANGUAGE

In this session we will explain how to

(i) Display records on the screen in a desired way and
(ii) Define formatting requirements for the printing of database records

Formatting Needs

In MICRO-ISIS formats are used for:

(a) Printing records called Print formats
(b) Displaying records called Display Formats
(c) Extracting data items for applying indexing techniques in FST, called Extraction Format

Formating Commands

Display of contents of FIELD/SUBFIELD

(a) *Field command*

To extract the value (content) of a field from a record, the letter V followed by the tag of the field is the expression/command It may be entered in upper or lower case.

Example "V200" where 200 is the tag number of the field Title of TERI database
"V300" where 300 is the tag number of the field Personal Author.

Example

Format	Output
V200	Cost benefit analysis for the development of magma power
V300	Harden J
V201	Energy Economics

(b) Subfield Command

To extract a particular subfield from a given field just append the corresponding subfield delimiter to the tag as shown below

V490^a where 490 is the tag number of the field Part Statement of TERI database and "^a" shows subfield delimiter and will retrieve the volume & issue No

V490^b	To retrieve only the content of field 490, subfield "b"
V490^*	Display contents of first subfield of the field having tag "490", even if the first subfield has no subfield delimiter.

Example

Format	Output
V490^a	14(4)
V490^b	302-307
V490	^a14(4)^b302-307
V490^*	14(4)

(c) Indentation Command

Normally when you format, the output will start from the current position available on screen or printer as the case may be You can alter this by providing an indentation command which must immediately follow the field/tag

Format : Vtt (f,c) where

f - indicates the number of spaces to be left from the left margin before formatting the first line of the field. It is only effective if the field is formatted at the beginning of a line, otherwise it is ignored.

c - indicates the number of spaces to be left from the left margin before formatting all continuation lines of a field formatted on more than one line

Example

Format	Output
V600	Chapter V in ’Generation and Diffusion of Agricultural Innovations The Role of Institutional Factors, edited by Ifitikhar Ahmed and Vernon W Ruttan
V600(5,0)	XXXXX Chapter V in ’Generation and Diffusion of Agricultural Innovations The Role of Institutional Factors, edited by Ifitikhar Ahmed and Vernon W Ruttan
V600(5,10)	XXXXX Chapter V in ’Generation and Diffusion of XXXXXXXXXXAgricultural Innovations . The Role of XXXXXXXXXXInstitutional Factors, edited by

V600(0,5)	Chapter V in 'Generation and Diffusion of XXXXXAgricultural Innovations The Role of XXXXXInstitutional Factors, edited by Ifitikhar XXXXXAhmed and Vernon W Ruttan

(X stands for one blank space)

(d) Displaying the Master File Number

Each record entered into a database is automatically assigned a serial number called Master File Number (MFN) MFN is also used as the index number in index entries. To extract the MFN of a record:

MFN or MFN(d) where d is the number of digits to be displayed if d is omitted 6 digits will be displayed by default.

Example

Format	Output
MFN	000004
MFN(3)	004
MFN(1)	4

Mode Command

While entering the data in a database, we use various delimiters like subfield delimiters, repeatable field indicators, triangular brackets and slashes for indexing. But these are not required in a report For the purpose of retaining/removing these delimiters from display or print and also to change the case of letters from lower case to upper case, MICRO-ISIS has a facility called **Mode parameters.**

MICRO-ISIS display data in three different modes

Proof Mode (P or p)	fields are displayed exactly as (P or p) they are stored in the record including the delimiters This mode is normally used to display records for proof reading purpose
Header Mode . (H or h)	this mode is normally used for (H or h) headings when printing catalogue and indexes If the data in the record contains descriptors in angular brackets, i e "<" and ">" signs, they are ignored while printing Also, subfield delimiters are replaced by punctuation (unless different punctuation is prescribed by you)

^a by ;
^b - ^i by ,
others by

Data Mode . (D or d)	is similar to header mode but in addition each (D or d) field is automatically suffixed with a fullstop followed by two spaces This automatic punctuation is suppressed if the field selector is followed by a suffix-literal.

Specification of Mode Command

A mode command is coded as Mmc where

M = Mode indicator
m = code of Mode - P - Proof
H - Heading
D - Data
c = case U - Upper case
L - data left unchanged

If no mode is specified, the system will assume default mode MPL.

Example

Format	Output
MPL,v330	^aCollege of Business Administration, Chicago State University^bChicago, IL 60628^cUSA
MPU,v330	^aCOLLEGE OF BUSINESS ADMINISTRATION, CHICAGO STATE UNIVERSITY^bCHICAGO, IL 60628^cUSA
MHL,v330	College of Business Administration, Chicago State University. Chicago, IL 60628 USA
MDL,v330	College of Business Administration, Chicago State University, Chicago, IL 60628, USA

Horizontal and Vertical spacing commands

The formatting language provides five commands to control horizontal and vertical spacing. They are

(a) Command Xn

Insert n spaces before formatting the next field. If on the current line less than 'n' number of spaces are available then the remaining number of spaces will be inserted in the second line

Example

Format	Output	
v440.x5.v490	1990 14(4) (302-307)	(5 blank characters left between field 440 and field 490)

(b) Command Cn

Tabulate from line position n i e leave (n-1) blanks. If the specified position is not available in the current line, display/print will skip to the next line to the specified column position This parameter is usually used to produce column output. If n is greater than the line width then this parameter is ignored. For example, for printer with 80 column margin, C81 will be ignored.

Example

	Format	Output
(i)	C10,V201,V409	xxxxxxxxxEnergy Economics, 14(4)(302-307) (x stands for one blank space) (V201 started printing from column position 10)
(ii)	V201,c30,V409	Energy Economics,#####14(4)302-307 (V409 started from column position 30)

(c) Command '/'

Skips to a new line, if the previous line is not blank If more than one '/' signs are used adjacently, it will have the same effect as that of using a single '/' sign.

Example

Format

```
mfn(2)/v10/v201/v100/v490/v440
```

Output

```
01

TIDE
Energy Economics
14(4)302-307
1992
5th field is blank in record
so line is not skipped
```

(d) Command '#'

Skips to a new line unconditionally

Example

Format

```
mfn(2)#v10#v201#v100#v490#v440
```

Output

```
01
TIDE
Energy Economics
Blank line
14(4)302-307
```

(e) Command %

Delete previously formatted blank line (s), if any

Example

Format

```
mfn(2)%v#10#v201%#v100%#v490%#v440
```

Output

```
01
TIDE
Energy Economics
14(4)302-307
1992
5th field is blank in record
so line is not skipped
```

Constants & Literals

Literal is a string of characters, enclosed between appropriate delimiters, which will be inserted in the output There are three types of literals

(a) Conditional Literals ". .... ."

It is used to define a constant which will be printed in output only if the associated field contains some value. Conditional literals does not obey the spacing parameters 'f' and 'c'

The conditional literals are enclosed in double quotation marks. The conditional literals are enclosed in double quotation marks

Example

Format

MFN(4), "Author:" v300

Output

002 Author: Haraden J

(b) Unconditional literals ' .. '

This parameter is used to include constants in the output whether or not the associated field is present in the record. They are enclosed in single quote.

Example

Format	Output
MFN(3), 'ISBN ' v100	001 ISBN (v100 is not present in record no 1)

(c) Repeatable literals | .. |

It is used to define a conditional constant that will be repeated for each occurrence of a repeatable field This parameter can be used to print all occurrence of a repeatable field The repeatable constants are used in vertical bars (¦)

If a repeatable constant specification is immediately followed by a '+' sign (e.g. ¦ .¦+) then the constant will appear in output **before all**, except the first occurrence of the associated field

If a repeatable constant specification is immediately preceded by a '+' sign (e g. +¦-----¦) then the constant will appear in output **after every** , occurrence of the associated field except the last one.

Example

Format

MFN · ', mfn(3)/mdl. "Author" " v300+¦,

Output

MFN 003
Title Barozzi G S, Imbabi MSE; Nobile E; Sousa ACM

MFN 005
Title : Mathur H B, Das L M, Patro T N

Dummy Field Selectors

A dummy field selector allows the conditional output of a literal based on the presence or absence of a given field or subfield without printing the contents of the associated field Dummy field selectors are coded as follows·

Dt or Dt^x OR Nt or Nt^x

D	indicates that the assoicated conditional literals to be printed if the field is **present**;
N	indicate that they must be output only if the field is **absent**
t	is the tag number
^x	is subfield delimiter code

Example

Format	Output
MFN (2)/"Author " d300,v300	02 Author Haraden J

Format	Output
MFN/"No Author" n300,	005 No Author

6 ELEMENTS OF FST (FIELD SELECT TABLE)

Now, we will examine how to create a Field Select Table which defines the criteria for extracting one or more elements from a master file record FST's are created or modified by means of the ISISDEF services using the MICRO-ISIS line editor. A sample FST is given below

Database name HRD FST for Inverted file FST name HRD

?	ID	IT	Data Extraction Format
	100	0	mhl, (V300/)

Enter/edit Field Identifier
Edit Replace

FST's are also used for specifying the contents of **Inverted file** or for specifying the **sorting requirements** of a printed listing It also defines the searchable elements in a database. Also in import/export of records between databases

The creation of inverted file can either be done after every data entry session (the system will ask) or later using the inverted file maintenance routines

Elements of Field Select Table

An FST consists of one or more lines, each defining three parameters

- a **field identifier (ID)**
- an **indexing technique (IT)** and
- a **data extraction format** coded using ISIS formatting language

Field Identifier is a number which is assigned to each element created during the indexting step. The meaning of field identifier depends on the purpose for which the FST is used

Inverted file FST: the field identifier acts as a qualifier to be used during searching You may assign the same field identifier for different fields and make them appear as one field when searching

Sorting FST: is the qualifier to be used in a user-supplied heading format.

Reformatting FST: is used for reformatting the output files by assigning tags (ISO) different from the original tags while exporting a database file.

Indexing Technique specifies a particular processing to be performed on the data to identify the specific elements to be created. There are five indexing techniques numbered 0 to 4 as explained below.

(a) Indexing Technique 0

Builds an element from each line extracted by the format. This is generally used to index whole fields or subfields

Example content of field 490 is

^a14(4)^b302-307

FST : 490 0 v490 (here 0 is the indexing technique 490 is the field identifier)

Format output ^a14(4)^b302-307

Element produced 490^a14(4)^b302-307

(b) Indexing Technique 1

Builds an element from each subfield or line extracted by the format As MICRO-ISIS searches for subfield delimiter codes, for this technique to work correctly your format must specify proof mode (MPL or MPU) MPL is default,

Example content of field 490 is

^a14(4)^b302-307

FST 490 1 v490
Format output ^a14(4)^b302-307
Element produced 490 14(4)
490 302-307

(c) Indexing Technique 2

Builds an element from each term or phrase enclosed in triangular brackets (< >) Any text outside brackets is not indexed This technique requires proof mode (MPU or MPL) (or no mode at all, as this is the default mode) because other modes delete the brackets.

Example

Suppose field 620 contains the following text

<Energy Planning Taiwan>(Environmental Quality Planning>

FST 620 2 v620

Element produced: 620 Energy Planning Taiwan
620 Environmental Quality Planning

(d) Indexing Technique 3

Does the same as '2' except the terms or phrases are enclosed in slashes (/ ./)

Example

Suppose field 200 contains the following text :

Mission report desribing a /University course/ in /document training/ at an Asian Country /library school/

FST : 200 3 v210

Format output : Mission report describing a /University course/ in /document training/ at an Asian Country /library school/

Element produced 200 University course
200 document training
200 library school

(e) Indexing Technique 4

Builds an element from each word in the text extracted by the format. When you use this technique you may prevent certain non-significant words (like a, an, and, be, by, into, to, etc) from being indexed by defining them in a special file called Stopword file Note that when this technique is used to index an entire field containing subfield delimiters, you must specify **heading or data mode** in the data extraction format, so that subfield delimiter replacement would take place before indexing Otherwise alphabetic subfield delimiter codes will be treated as part of a word

Example Contents of field 300 is

MAHMUD WAHIDUDDIN%MUQTADA M

FST : 300 4 mhu,(v300/)

Format output
BAROZZI G S
IMBABI M S E
NOBILE E
SOUSA A C M

Element produced: 300 BAROZZI
300 G
300 S
300 IMBABI
300 M
300 S
300 E

Data Extraction Format

This is used to define a display format for the field. This format is different from the one you specified in the display format This format is applicable only for the field for which it is defined. You can define data extraction format parameters, as explained at time Print Format/display format creation.

6 THE MICRO-ISIS SEARCH LANGUAGE

Now, we will learn how to .

(i) search using different search parameters and
(ii) formulate a search query.

Role of Searching

Searching plays an important role in the utilisation of a database It is used to generate reports to get the required information So you should be well familiar with how you can formulate your queries. In the following section we will explain the use of different operators available for MICRO-ISIS.

Search Expressions

Type of search terms

(a) **Precise term** is any searchable element defined for a given database specified exactly the same way as it is known to MICRO-ISIS

Example : Search term
Energy Planning

(b) Right-truncated terms

Instead of specifying a precise search term, you may jsut give a root. This technique referred to as root searching or right truncation,

Example Assume that your list of search terms contain the following·

BIOGAS Soyabeen
BIOGAS Plant
BIOGAS Plants
BIOGAS Production
BIOGAS Technology

The search term **BIOGAS$** will search for all records having words

BIOGAS: Soyabeen
BIOGAS Plant
BIOGAS Plants
BIOGAS Production
BIOGAS Technology

BIOGAS Production:$ will retrieve all records having

BIOGAS PRODUCTION: Agriculture
BIOGAS PRODUCTION. Alginate
BIOGAS PRODUCTION: Sugar Mill

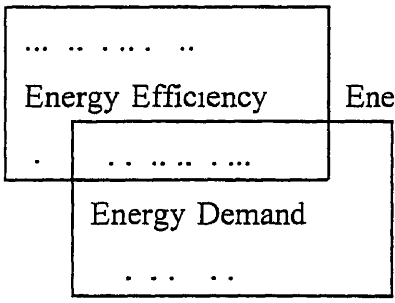
Search Operators

You can combine two or more search terms in a search expression by using search operators which indicate the intended relationship between the terms These operators are called **Boolean Operators**. They are

(a) **OR** (inclusive)

It is the union operator. The result of a logical "OR" between the two classes is the class obtained by merging two classes retaining common elements, if any, only once. The symbol used is "+"

Example

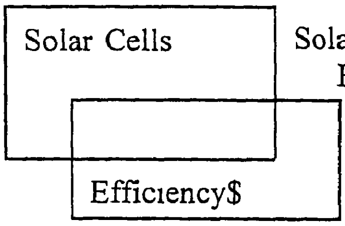


Energy Efficiency + Energy Demand

(b) **AND** (intersection)

It is the intersection (AND) operator. Only those elements which are common to both classes are retrieved. The symbol used is "*" The result of a logical "AND" may be an 'empty' class i e a class containing no elements.

Example

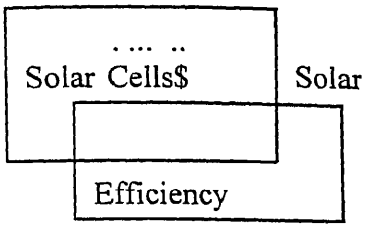


Solar Cells * Efficiency$ **or**
Energy Consumption * Industries

(c) **NOT** (exclusive)

The class contains the elements of first class which do not belong to the second class. The symbol used is " ^ "

Example



Solar Cells$ ^ Efficiency$

Field Level and Proximity Search Operators

These operators are more restrictive than logical AND operator, and are particularly useful for natural language searching.

The operators are .

(i) **(G)** It searches for the occurrence of both the search terms in the same field. (all occurrences of a repeatable field are treated as one)

Example

Energy (G) Rural will retrieve all records with both Energy and Rural provided that they occur in the same field.

(ii) **(F)** It searches for the occurrence of both the search terms in the same field or a repeatable field

Example

**Gupta$ (F) Pachauri$** will retrieve all records with both Pachauri$ and Gupta$ in the same field or the same occurrence of a repeatable field.

(iii) As (F), but with additional restriction that the terms are no more than n words apart where n is the number of periods minus one

Example

A B Adjacent
A . B Atmost one word between A & B
A . B Atmost two words between A & B

(iv) $ As (F) with additional restriction that the terms are exactly 'n' words apart, where n is the number of dollars minus one.

Example

A $ B Adjacent
A B Exactly one word between A & B
A . B Exactly two words between A & B

Syntax of search expression

(highest)	(1)	$ or
	(2)	(F)
	(3)	(G)
	(4)	* or ^
(lowest)	(5)	+

from left to right for operators of same priority

To change the order of evaluation you can use parentheses

A + B * C = A + (B * C);
(A + B) * C is different

Operand Qualifier

You may use a qualifier to specify the field or group of fields in which you want a term to appear This is particularly useful for databases which may contain the same data in a number of different fields.

Format · search term/ (t1, t2, t3, . .)

where t1,t2,t3 .. are set of field identifiers where you want the term to be searched

Example RURAL (F) EMPLOYMENT (F) CREATION/(300)

In this case only those records having all the terms in the same occurrence of field 300 will be retrieved

7. SEARCH COMMANDS

A search can be performed in the following ways .

- by giving a search expression
- by using search operators
- by using a set number
- by using the dictionary list (Keyword search)

Search expression

The basic building block of a search formulation is a search expression. Search expression can be formed while selecting S option in ISISRET services from the main menu

ACTION : S

System Prompt "Search expression"
(here you can type any term you want to search)

Set Number

A search can be executed by using set numbers The format of the set number search is #N. Whenever you use a set number for a search, the search result will be given a new number.

Example

Search expression ?

```
# 1                        > set number
Set 2   #1
P = 3 #1
T = 1 - #2 : #1
```

Dictionary List

Select option 'T' from the menu 'EXGEN' The system will display response with a screen entitled "Dictionary list" and you will be prompted to give a key The key can be a letter, or a word or part of a word. A two column list will be displayed starting with your key.

ACTION T
EFFECT Following screen will be displayed
PROMPT

To select a term from the displayed list, bring the cursor to the desired term using <CR> to go down, 'TAB' key to go up, and arrow keys in the numerical key pad, and press 'S' Press PgDn key will display the next page

During a given session, a previous query can be re-executed either as it is or with modifications, either on the same database or another database (MICRO-ISIS) For this,

Step note the set number of the query in the list displayed when 'R' option is used.

Example set no. 1

ACTION <CR> To return to main menu

ACTION G To select option 'G'
PROMPT SET

(Key in the set number at the cursor position against the prompt in the left bottom of the screen and <CR> The system will display the query which may be edited if necessary)

ACTION S (To search the terms in the new database)

(Any of the previous queries can be re-executed on the selected database and display format can be changed)

The retrieved records can be saved by selecting Option "P" from the menu "EXGEN" by giving a file name The extension of this file will be **.SAV**

8 PRODUCTION OF REPORTS

ISISPRT Services

ISISPRT services is used to produce printed reports Each time you use the ISISPRT service you will be asked to provide the specific sorting and page lay out parameters, you require for that particular print run. These are entered through two system work sheets called the **Print worksheet and Sort worksheet**

ACTION Call ISIS program and select option 'P'
(ISISPRT require a database selection)
EFFECT Following menu EXPRT will be displayed.

```
 Service ISISPRT          Sorting and Printing        Menu  EXPRT

                          L - Change dialogue language
                          S - User print worksheet
                          P - System print worksheet
                          X - Exit
                                        ?
```

Fig. 15

System Print Worksheet

ACTION Select option 'P'
EFFECT The system print worksheet "EYPRY" will be displayed as given in Fig 16.

```
Database Name   HRD ______ MFN limits  1/32000   Save file name _______
First Title ______________________________________________________________
__________________________________________________________________________
Second Title _____________________________________________________________
__________________________________________________________________________
Third Title ______________________________________________________________
__________________________________________________________________________
Print Format _____________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Line width     70         Number of columns  1     Column width         70
Lines/page     60         First page number  1     EOC tolerance         3
Data indention      0          Sort ? N            Sort worksheet name________
                                                         Print file name __________
<-- 1  Next page     M - Modify   C - Cancel     X - Exit
```

Fig. 16

(Note that some fields are empty and others already contain a value The pre-defined values are the default values MICRO-ISIS will use, unless you modify them).

Parameters of System Print Worksheet

(a) Database name

The name of the database you want to print

(b) MFN limits

The range of master file numbers to be printed have to be given here Give lower and upper level separated by a slash

(c) Save filename

This field has to be filled-in if you are printing the results of a saved file after conducting a search in the ISIS program Give the same name you have used to save the search.

(d) First Title, Second Title, Third Title

You can provide up to three report titles which the MICRO-ISIS will print at the beginning of the report. All title lines starting with an asterisk (*) will be printed in all the pages of the report Title line may be upto 254 characters.

(e) Print Format

Provide the name of a format defined in the ISISDEF program or enter an actual format.

Example @TERI

Example MFN(2), ' - ' v1/v2/v3 #

For printing of indexes use '*' as print format and specify at least two sort keys as your index terms in the sort worksheet.

(f) Line width

The parameter indicates the maximum line width in number of print positions that must be used in printing the output. It must not exceed the maximum number of print positions available on your printer.

(g) Number of columns

It indicates the number of columns per page With a 80 columnm printer do not give more than two, unless you are doing an index print in which case you can specify three or four.

(h) Column width

This parameter has to be defined if you specify more than one column per page. The actual width of a single column has to be mentioned here.

Column width = line width + space between two adjancent columns

If you spcify more than one column, you must ensure that (No of columns - 1) x column width + line width does not exceed the number of print positions available on your printer.

(i) Lines/Pages

It specifies maximum number of lines per page

(j) First page number

Give the page number you want to start with. Give '0'if you want to print without page numbers, but with form feeds. Give 'N' if you want to print without formfeeds and page numbers. It is useful to produce text files which you want to process outside ISIS.

(k) EOC tolerance

The parameter indicates the minimum number of lines which must be available on the current page/column for printing a record It is used for avoiding the printing of heading alone in one page and the related details in next page It can also be used for printing separate records in separate pages

The default value of this parameter is 3, which implies that atleast three lines of record must be printed in a page If the available space is less than 3 line, the whole record will be printed in the next page

If every record has to be printed in separate pages, specify the EOC tolerance greater than Lines per page 2

(l) Data7Xindention

Indicates the indentation of each level of heading. Will only function in connection with a sort worksheet Default value = 0

(m) Sort

If you want to sort the records before printing use 'Y' if not use 'N' If you give 'Y' you will be requested to complete the Sort worksheet "EYSRT"

(n) Sort worksheet

You can give a pre-defined worksheet name. If you leave it blank the program will provide the system worksheet.

(o) Print File name

It specifies either the name of the file which store the output or the name of the printer device, if you want the output to be printed immediately If you leave this field empty, MICRO-ISIS will store the output in a file called dbn LST

If you want to produce a hit file, you may specify "null" as the print file name. In this case, the print run will terminate as soon as the "HIT FILE" is generated

Note· In dbn LST, dbn is the database name. This file can be printed later from DOS by using 'copy dbn lst lpt1' for a printer output or 'type dbn.lst|more' for a screen output

User print Worksheet

ACTION	.	Select option S from the EXPRT
PROMPT		Name of worksheet (You may provide the name of the user worksheet created by using ISISUTL services The creation of a user print worksheet is explained in Chapter VIII)
EFFECT		The user worksheet will be displayed and can be modified, if required (The modification is valid only for this run. For permanent change, you have to again use ISISUTL services)

System Sort Worksheet

The ISISPRT program allows you to sort the records in vitually any desired sequence before they are printed To do this you must specify the required sequence by means of a Field Select Table, which is a general device which allows us to extract data elements from a database record

A data element used for sorting is called a "Sort Key" MICRO-ISIS uses the FST to build the required sort keys and then sort the records, which will therefore be printed in the order resulting from this sort

The worksheet EYSRT as shown in Fig will be displayed after the print worksheet, if you have pressed "Y" in the "SORT" field of print worksheet. It contains the parameters for sorting and handling of headings

Number of Headings 1 Stopword filename ________

Heading format ____

Length of first sort key ________ Heading Processing Indicator 0

FST for first sort key ____

Length of second sort key ________ Heading Processing Indicator 0
FST for second sort key ____

Length of Third sort key ________ Heading Processing Indicator 0

FST for Third sort key ____

Length of fourth sort key ________ Heading Processing Indicator 0

FST for fourth sort key ____

<--1 Next page M - Modify C - Cancel X - Exit

Parameters of System Sort Worksheet

(a) Number of headings

Must be one less than the numbers of sort keys Note that if the first field defined in your display format is the same as your first sort key (Example author) you may specify heading = 0 in order not to have the same information repeated

For example, in a list arranged by author (first sort level) and title (second sort level), you would use only one level of heading.

(b) Stopword file name

If you are using indexing technique 4 in your FST's to generate sort keys you may want to provide a stopword file, containing the list of non-significant words In this case enter here the name of the Stopword file

(c) Heading format

MICRO-ISIS uses a default heading format as given below·

MHL. ""MHL#V1(0,i)/""v2(1,2i)/""v3(2,3i)/ . ....#

where i is the value you have assigned to the data indentation parametere on the print worksheet. v1. v2. v3 are the first, second. third headings The above default format leave one blank line before each heading and one blank line before the first record printed under thelast level heading. You can design your own format.

Note that even though in an FST we provide identification number same as the tage number of the field, in sort worksheet the identification numbers are to be given sequentially i.e 1, 2, 3 etc These numbers are used as tag number in the default heading format.

(d) Sort key parameters

You may specify up to four sort keys, which will be treated in a hierarchical manner. The first or primary sort key determines the primary sort sequence, the second sort key provides ordering of those records having the same primary sort key etc.

For each key, you must provide the three parameters described below·

(i) Field Select Table

It defines the content of teh sort key. You can give a pre-defined FST taken from the ISISDEF program Example "@TERI" or provide an actual FST like 1 0 v1

(ii) Heading Processing Indicator

It indicates, whether MICRO-ISIS should build a single sort key or one sort key for each element produced by the field select table It also indicates whether headings should be unique, i.e. printed only when they change, or printed in all cases

Note If you are sorting by author by using 0 or 2 parameter, the records will be displayed only by the first author.

If you are sorting by author, using 1 or 3 the records will be repeated under the name of each author. This option is normally used for the production of indexes

The FDT of TERI Databases

?	Tag	Name	Len	Typ	Rep	Delimiters/Patte
-	1	Record ID	15	X		
-	6	Publication No	15	X		
-	10	Record ID SS	15	X		a
-	15	Bibliographical Level	7	X		ab
-	20	Source of Record	7	X		ab
-	22	Date Entered	10	X		a
-	60	Type of Material	25	X		a
-	100	ISBN No	15	X		a
-	101	ISSN No	15	X		a
-	113	Hard Copy No	6	X		
-	115	Country Code	8	X		
-	200	Title	200	X		abls
-	201	Serial Title	200	X		abls
-	210	Title (Parallel)	200	X		abls
-	260	Edition	15	X		abl
-	300	Personal Author	200	X	R	a
-	310	Corporate Author	200	X		abcdefglsz
-	320	Conference/Meeting	200	X		abceghijlsz
-	330	Affiliation	200	X		ade
-	400	Publisher	200	X		abcd
-	440	Date/Publication	10	X		ab
-	460	Collation/Pagination	50	X		ab
-	480	Monograph/Series Statement	100	X		ac
-	490	Part Statement	25	X		abc
-	500	Note	100	X		a
-	600	Abstract	300	X		a
-	610	Class No 3X(UDC)	50	X		tab

-	620	Descriptor(s)	200	X	R	<>
-	623	TERI Subject Gr.	50	X	R	a
-	630	Standard No.	50	X		ab
-	631	Patent No.	55	X		abcd
-	680	Thesis	50	X		ud
-	720	Tracing	300	X	R	
-	809	Indenders Name	50	X		
-	900	Accession No.	50	X		

Availability in India.

Mr B N Sarkar
NISSAT/DST
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New Delhi - 110 016

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E-mail bgs@nissatd.ernet.in

2nd DAY

Secondary Sources of Information

Contents

- *Yearbooks Objective, Purpose, Examples*
- *Directories Objectives, Examples*
- *Statistical Sources Functions, Examples*
- *Advances, Progresses, Reviews and Surveys Functions, Importance, Examples*
- *Handbooks, Manuals, Sourcebooks and Guidebooks. Functions, Importance, Examples*
- *Encyclopedia Purpose, Importance, Examples*
- *Secondary Sources of Information in Energy and Environment*
- *Appendix The bibliographic details of the examples cited in the Course Material*

Year Books

They are referred to trace varied information about each country They are compiled to cover important developments, activities and statistics in various fields in a particular year They include,

- Major developments in science and technology
- Short account of the current political, social and cultural events of the year
- Statistical information in various fields especially economics, commerce, environmental, trade and industries etc
- Chronological listing of important annual events.
- Summaries of major events in sports, achievements, prizes, awards etc in different fields of activities
- Brief biographical data of well known people in different fields and obituaries of notable personalities
- Particulars regarding capital, area, population, language, religion, currency of the nations of the world
- Current trends, research and development in various subjects
- Annual, recent information to serve as supplement to encyclopedias.

Examples

Manpower Profile India Yearbook 1995
New Delhi Institute of Applied Manpower Research, 1995 341 pp

India Economic Information Yearbook 1996
New Delhi National Publishing House, 1996 366 pp

The Statesman's Yearbook, 1995–96
London Macmillan Press, 1995 1699 pp

Directories

Directories are very useful to locate answers to agency or biographical queries as they cover information about organizations and their members, as well as notable personalities in various fields in the world They include,

- List of organizations or persons arranged in alphabetical or classified order

- Names and addresses of organizations and persons including their telephone number, fax number, telegraphic, e-mail address etc.

- Functions, objectives and activities of organizations.

- List of office bearers and members, their official and residential addresses, designations, qualifications, working experience, academic achievements, publications etc.

- Special directories provides vital information about
    - professional organizations and their numbers
    - industries and their products
    - universities and colleges, their addresses, professional staff member, courses, date of establishment etc.
    - booksellers, distributors and publishers
    - libraries, museums, scientific institutions, research and training institutions etc
    - buying guides giving details of manufacturers products, quality, prices, advantages and disadvantages
    - periodicals, magazines and newspapers

Examples

Directory of Rural Technologies Volume 4—Energy Systems
New Delhi: CAPART, 1992 204 pp

CMA Telephone Directory
New Delhi Cement Manufacturer's Association, 1992 143 pp

Indian Library Directory
Delhi Indian Library Association, 1985 251 pp

Directory of Science and Technology Information Systems
New Delhi Ministry of Science and Technology, 1990 153 pp

Indian Pulp and Paper Technical Association Membership Directory 1985
Saharanpur IPPTA, 1985 222 pp

Directory of Technology Promotion Institutions in Asia & the Pacific
Bangalore Asian and Pacific Centre for Transfer of Technology, 1989 356 pp

Directory of R & D Institutions 1992
New Delhi: Ministry of Science and Technology, 1992 145 pp

Statistical sources

They provide numerical data to answer reference questions starting with "How many" and "How much" They provide,

- Ready-made compiled statistics in all the fields.
- Authentic data in all sorts of subjects from official data collected, checked and rechecked by expert statisticians
- Population statistics regarding births, deaths, age wise, sex wise in various fields
- Historical statistics of multiple aspects in last century, decades or years
- Comparative statistics of various countries in several aspects over a time span of few years The statistical information is about agriculture, animal and forest industries, commerce, communication, different aspects of economics, education, demography, finance, government and constitution, irrigation, mining, transportation etc.

Examples

Statistics for Iron & Steel Industry in India, 1996
New Delhi Steel Authority of India Limited (SAIL), 1996 436 pp

Energy Statistics and Balance of Non-OECD countries 1993–94
Paris OECD/IEA, 1996 574 pp

Indian Petroleum and Natural Gas Statistics 1994–95
New Delhi Ministry of Petroleum and Natural Gas, 1996. 217 pp

Advances, Progresses, Reviews and Surveys

They are secondary sources compiled from various primary sources in a particular discipline and are arranged according to a definite plan They are useful for the specialists to get information in specific fields of their interest They consists of articles on-

- already published literature
- current, significant trends in development
- research in progress
- analysis of the progresses made in research and practice

Examples

Horticultural Review: Volume 8
West Port· AVI Publishers, 1986. 392 pp

Annual Review of Ecology and Systematic. Volume 16
Pala Alto: Annual Review Inc., 1985. 504 pp.

Annual Review of Fluid Mechanics
Palo Alto: Annual Review Inc , 1978 475pp.

Advances in Heat Transfer
Orlando, Florida: Academic Press, 1987. 504 pp

Progress in Batteries and solar cells: Volume 2
Ohio· JEC Press, 1979 314 pp

Handbooks, Manuals, Source books and Guide-books

They are handy, single volume ready reference source on a specific subject in a variety of forms They deal with already established knowledges They are;

- Compendium of facts in shorthand form consisting of diagrams, graphs, tables, equations, formulas, principles, procedure, instructions etc.
- Concise treatise of facts of popular interests.
- Self-instructional manuals to operate and repair machines and equipment
- Guide to family health and first-aid and rules for government servants
- Handbooks for historical and literary information as well as various subject specialists.

Examples

Energy Information Guide Volume III Fossil Fuels
Santa Barbara ABC-Clio Information Services, 1984 813 pp

Handbook of Indigenous Manufacturers. Chemicals and Miscellaneous Stores
New Delhi India Investment Centre, 1985 482 pp

Handbook of Procedures Volume 1, 1 April 1992–31 March 1997
(Amendments made upto 30th April 1995)
Delhi Controller of Publications, 1995 470 pp.

Handbook of Information, Scientists and Libraries in India
New Delhi: Citation Publication, 1980. 185 pp

Encyclopedia

The purpose of the modern encyclopedia is to condense current and essential information in a short and simpler form to make it accessible to the non-specialists An encyclopedia is a storehouse or treasury of valuable knowledge giving significant information It can be general information for the layman or subject information for specialists.

Example

Van Nostrand's Scientific Encyclopedia. 6th Edition
New York Van Nostrand, 1983

Encyclopedia of associations 1990. Volume I, Part I, 24th Edition
Michigan Gale Research Inc., 1989 1097 pp.

List of secondary sources

Energy

- Annual Review of Energy and the Environment. 1996
  - This secondary source contains the best invited articles in the subject.
  - Contains critical articles reviewing significant developments within each major disciplines
  - Subject index & cumulative index are given
- Cogeneration and Small Power Production Manual 1994
- Directory of Power Utilities in AFRO-ASIAN Region 1996
- Electricity Law Manual. 1996
  - This document is classified into three parts Part-I contains The Indian Electricity Act 1910, Part II contains The Electricity (Supply) Act, 1948, and Part III contains The Indian Electricity Rules, 1956
- Electricity Retail Wheeling Handbook 1995
  - In this publication, the discussion of retail wheeling of electricity is the predominate theme A basic overview of regulation processes and electricity tariff schedule provision is included Contains keyword index.
- Encyclopedia of Energy Technology and the Environment. 1995
- Energy Conservation Directory 1993
- Energy Technology Handbook 1977
- Guide to New Natural Gas Utilization Technologies 1985
- India's Energy Sector, September 1996
- Indian Petroleum Directory. 1996
- International Association for Energy Economics Membership Directory. 1993

  This Directory contains;

  - (i) IAEE Alphabetical Membership listing, (ii) IAEE geographical Membership listing, and (iii) by laws of International Association for Energy Economics

- International Power Industry Directory. 1996

  - The directory is organized into ten sections· Consultants, Developers, Engineering and Construction, Financial, Fuel providers, Law firms, Equipment providers, Trade groups, Branch offices, and company index. Subsections, when used are listed on the first page of the section. Branch office section has also been added It lists the main corporate name and below it, the additional office or company, address, phone, fax, e-mail, web-site, contact name, and when provided, technology and region data. The company index lists, in alphabetic order, all companies in the directory and on which pages the listing appear
  - Company Information Listed: Each listing includes company name; address, phone, fax, and toll-free number, e-mail address; website, contact name and title, market region and technology area is provided by the company Companies with other locations have an asterisk (*) beside the name The branch office section contains the additional listing. The equipment provider section also includes business type The abbreviations for the codes used in market region, technology area and business types are listed

- Power Directory 1993

  - Contains Articles and Directory Section. The Power Directory features technical contributions from eminent experts all over the world. The directory contains; (i) buyers guide; (ii) Transmission equipment, (iii) transformers and transformer accessories, (iv) distribution equipment; (v) utilization equipment, (vi) instrumentation, (vii) power plant auxiliaries, (viii) contractors, (ix) consultants

- Public Electricity Supply All India Statistics - General Review 1995

  - The publication presents in a summarized form, salient features of the progress and development of electricity supply industry in the country Each state and union territories, progress and achievements.

- TEDDY. 1996

  - Most comprehensive and reliable guide to the academic world.
    Contains directory details for over 26 000 universities, colleges, schools of art and music, libraries, archives, learned societies, research institutes, museums and art galleries.
  - Arranged alphabetically by country
  - Every important library is covered, with details of the number of volumes held and outstanding features of the collection
    For each institution there is a list of key academic staff and officials over 150 000 in total.

- The Yearbook of Renewable Energies 1992

- World Energy Directory—a guide to organizations and research activities in non-atomic energy. 1988
  - The directory has been compiled from a worldwide survey of organizations involved with executing, financing or supporting energy research, development and demonstration work Entries are included from research institutes, government departments, public corporations, industrial firms, electricity generating boards, learned and professional societies, universities and other institutes of higher education Broadly speaking, it covers the efficient utilization of present energy sources; the development of new resources such as solar wind waves, geothermal and biomass, energy conversion technologies; improved combustion techniques such as fluidized bed combustion, energy storage; energy handling equipment like heat pumps engines and boilers, and paper studies covering energy policy, forecasting and computer modelling Contains two indexes *viz*, titles of establishments index and subject index.

Environment

- ACCIS Guide to United Nations Information Sources on the Environment 1988
  - This is a guide to sources of information within the United Nations system on environmental concerns
  - The guide is arranged in 5 sections comprising sources of information on the environmental, subject categories, existence of the directories produced by ACCIS, INFOTERRA addresses etc.
- A handbook on Pollution Control by Industries & Government bodies with Supreme Court Decisions. 1988
- Coal Information 1994
  - This document is a comprehensive reference book on current world coal market trends and long-term prospects.
  - Contains analysis and country specific statistics for OECD member countries and selected non-OCED countries on coal price, demand, trade, supply, production capacity and emission standards for coal fired boilers
  - The document also includes a summary of environmental policies on climate issues as well as essential facts on coal importing and exporting ports and coal fired power stations in coal importing regions
  - This document is an IEA statistics publications
- Directory of Environmental Impact Assessment Studies in some Asian Countries 1994
- Directory of Global Environmental Sciences in Japan-Research & Information 1990
- Directory of International Environmental Organizations 1991

- Directory of Non-Governmental Environment and Development Organizations in OECD Member Countries 1992

- Directory of short-term Environmental Courses 1993

  - The objective of the Directory is to serve a target population of public and private environmental officials in Asia and the Pacific with easily accessible information on environmental training opportunities in the U.S private sector, government agencies, non-governmental organizations and universities The course listed in the Directory provide training to environmental officials in economically sustainable environmental technologies and management practices

- Environment Industry Yearbook 1996

  - It is the most authoritative and respected references work on matters such as recycling, waste, water, pollution control and environment management. The document is divided into three parts.
  - Part I Industry Information & Contacts. This section brings together contacts and reference information of general use to anyone in business or industry looking for government for government or regulatory contacts
  - Part II· Special Services: This contains (i) Industry, information and contacts, Information services, (ii) Information services; (iii) Training and recruitment; (iv) Laboratory analysis, (v) Computer services and software, (vi) Legal advisors, (vii) Environmental consultants, (viii) Waste management, (ix) Recycling and paper, (x) Water and waste water treatment
    Firms providing any of the above services also have their services profiled and cross referenced in more detail in each of these service sections, (in addition to their basic organization profile and classified listing in section xi)
  - Part III Equipment & Suppliers Guide (Section xi at the back of the book)
    This section is in two parts organization profiles and classified guide to equipment and services It profiles and categorizes the products and services provided by commercial firms active in the market including environment related organizations, associations and institutes The organization profile will show the firms relative size and experience and also guides to any specialist services it provides which are described in other sections of the yearbook

- Environmental Impact Analysis Handbook 1980

- Environmental Laws of India 1994

- Environmental Management Handbook. 1992

  - This document is based on literature sources and background materials from more than hundred experts in various fields of environmental protection

- Environmental NGOs in India-A Directory. 1994
    - Provides useful information about the organizations included in it.
      NGO profile - state wise & Union Territories
      Content of the name of the NGO arranged alphabetically
      This directory has name index
- Environmental Profile of Pakistan 1988
    - The profile is intended to provide direction in future efforts to deal with the management, conservation, and rehabilitation of the environment and natural resources.
    - The report covers a wide variety of subjects which are of vital interest to Pakistan in the field of environment and development
    - Contains 13 chapters comprising policy response to environmental challenges, environmental education, institution and legislation, tourism, human health, aquatic terrestrial ecosystems, environmental setting etc.
- Environmental Strategies Handbook. 1994
- Handbook for Environmental Planning—The Source Consequences of Environmental Change. 1977
- Handbook of Air Pollution Analysis. 1986
- Handbook of Air Pollution Technology. 1984
- Handbook of Environmental Data and Ecological Parameters 1979
- Handbook of Environmental Management and Technology 1993
    - This hand book is comprehensive in scope This document touches on virtually all the major pollution problems and their solution The handbook is divided in six parts
- Handbook of Industrial Waste Disposal 1980
- Indian Environmental legislation-guide for Industry and Business. 1995
    - This guide has been designed as an easy-to-use reference on environmental legislation in India, to facilitate better understanding of the provisions concerning industry and business while setting up oi operating an industrial unit
- Manual of Environmental Technology in Developing Countries 1991
    - Manual of guidelines primarily for use by environmental technologists of the developing countries
      Each chapter of the document includes a listing of pertinent references utilized, including those written by the authors These are numbered and these numbers are keyed into the text Only references keyed into the text are listed.

- The Handbook of Environmental Powers. 1976
- The HINDU Survey of the Environment 1995
- The World Environment Handbook A Directory of Natural Resource Management Agencies and Non-government Environment Organizations in 145 Countries. 1985
- Waste, Recycling & Environmental Directory. 1992
- World Directory of Environmental Organizations Handbook of national and international organizations and programms governmental and non-governmental concerned with protecting earth's resources

General

- Commonwealth Universities Yearbook 1995
- India 1995-A Reference Annual 1996
    - This is an established work of reference
      One chapter deals exclusively with Environment.
      Information in the Annual has been compiled from official and other authentic sources with the cooperations of central ministries/department/state governments/union territory administrations and other government agencies
- The World of Learning. 1993

Appendix

ACCIS Guide to United Nations Information Sources on the Environment
New York: United Nations, 1988. 141 pp.

Goswami, D
Handbook on pollution control by industries and government bodies/with Supreme Court decisions
New Delhi Emcon Business Review, 1988 372 pp

Socolow R H (ed.)
Annual Review of Energy and the Environment
Palto Alto, California Annual Review INC, 1996. 576 pp.

BIS Handbook
New Delhi Bureau of India Standards, 1991. 575 pp

Coal Information
Paris. International Energy Agency, 1995. VP

Spiewak, S A
Cogeneration and Small Power Production Manual
Lilburn, GA· Fairmont Press, 1994 296 pp.

Commonwealth Universities Yearbook (Volume 1 & 2) 1995-96
London: Association of Commonwealth Universities, 1995

Directory of Environmental Impact Assessment Studies in some Asian Countries
Bangkok, Thailand AIT Environmental System Information Centre, 1994

Directory of Global Environmental Sciences in Japan-Research and Information
Tokyo Research Development Corporation of Japan, 1990 183 pp

Yıldırım F B
Directory of International Environmental Organizations Turkey (IULA-EMME) International Union of Local Authorities, 1991 190 pp

Directory of Non-Governmental Environmental and Development Organizations in OECD Member Countries
Paris OECD, 1992 409 pp

Directory of Power Utilities in AFRO-ASIAN Region
New Delhi IAEGTD (International Association on Electricity Generation, Transmission and Distribution) 1996 150 pp

Directory of Short-Term Environmental Courses, November 1993-December 1996
Washington DC USETI (United States Environmental Training Institute), 1993 274 pp

Electricity Law Manual
Delhi Universal Law Publishing, 1996 UP

Electricity Retail Wheeling Handbook
Lilburn, Georgia. Fairmont Press, 1995 313 pp

Bisio A (ed)
Encyclopedia of Energy Technology and the Environment
New York. John Wiley, 1995

Moraes C P (ed.)
Energy Conservation Directory
Bombay Astra Publishers, 1993 452 pp.

Considine D M
Energy Technology Handbook
New York Mc Graw Hill, 1977, VP

Environment Industry Yearbook 1996
London Macmillan Press, 1995 VP

Rau J G
Environmental Impact Analysis Handbook
New York Mc Graw-Hill, 1980 VP

Desai B (ed)
Environmental Laws of India-Basic Documents
New Delhi. Lancer Books, 1994 438 pp (Environmental Law Series)

Ryding Sven-olof (ed)
Environmental Management Handbook
The Netherlands. IOS Press, 1992 777 pp.

Environmental NGOs in India-A Directory
New Delhi. WWF (World Wide Fund for Nature-India), 1994 638 pp

Environmental Profile of Pakistan
Islamabad Govt of Pakistan, 1988 248 pp

Kolluru R V
Environmental Strategies Handbook
New York Mc Graw-Hill, 1994. 1030 pp.

Hay N E (ed)
Guide to New Natural Gas Utilization Technologies
Atlanta, USA Fairmont Press, 1985 359 pp

McEvay J
Handbook for Environmental Planning the Social Consequences of Environmental Change
New York: John Wiley, 1977 323 pp

Harrison R M
Handbook of Air Pollution Analysis
London. Chapman and Hall, 1986 634 pp

Calvert S
Handbook of Air Pollution Technology
New York: John Wiley, 1984 1066 pp.

Jorgensen SE & Others
Handbook of Environmental Data and Ecological Parameters
Oxford: Pergamon Press, 1979. 1162 p
(Environmental Science and Application Series, 6)

Holmes G
Handbook of Environmental Management and Technology
New York: John Wiley, 1993 651 pp

Conway R A
Handbook of Industrial Waste Disposal
New York Van Nostrand, 1980 565 pp

India 1995-A Reference Annual
New Delhi India, Ministry of Information and Broadcasting, Publication Division, 1996 951 pp

India's Energy Sector, September 1996
Bombay: Centre for Monitoring Indian Economy, 1996 211 pp

Chaturvedi A K
Indian Environmental Legislation Guide for Industry and Business
New Delhi Confederation of Indian Industry, 1995 215 pp

Chowdhary L R
Indian Petroleum Directory
Dehradun Indian Petroleum Publishers, 1996 242 pp

International Association for Energy Economics 1992-93 Membership Directory
Cleveland, Ohio. International Association for Energy Economics (IAEE), 1993 148pp.

International Power Industry Directory
Tulsa, Okhlahama Penwell Publications, 1996 182 pp

Ludwig, Harvey F *et al*
Manual of Environmental Technology in Developing Countries Volume 1 & 2
South Asian Publishers. New Delhi, 1991

Morales C P (ed)
Power Directory
Bombay Astra Publishers, 1993 500 pp

Public Electricity All India Statistics-General Review 1993-94
Delhi Controller of Publications, 1995 214 pp.

Tata Energy Data Directory and Yearbook (TEDDY) 1996/97
New Delhi Tata Energy Research Institute, 1996 470 pp.

Whittaker C
The handbook of Environmental Powers
London· The Architectural Press, 1976 174 pp.

Ravi N (ed)
Hindu Survey of the Environment
Madras Kasturi & Sons, 1995 224 pp

Baker M
The World Environment Handbook A Directory of Natural Resource Management Agencies and Non-Governmental Environmental Organizations in 145 Countries
New York. World Environment Centre, 1985 280 pp

World of Learning 1993
London· Europa publications limited, 1992 2072 pp.

Scheer H (ed)
The Yearbook of Renewable Energies
Bochum, Germany Ponte Press, 1992. 269 pp

Graham S (ed)
Waste, Recycling and Environmental Directory 1993
London Thomas Telford. 1992 904 pp

Trzyna T C
World Directory of Environmental Organizations A Handbook of National and International Organizations and Programs-Governmental and Non-Governmental Concerned with Protecting the Earth's Resources
California· California Institute of Public Affairs, 1992. 231 pp

Wren B
World Energy Directory—A Guide to Organizations and Research Activities in Non-Atomic Energy
Essex. Longman, 1988 431 pp

Novell®

- Networking Primer: Technology Today -

- What is a Computer Network?
- What are the Benefits of Computer Networking?
- Hardware Technology
- Connecting Network Devices
- Controlling Data Transmission
- The Network Operating System
- Desktop Operating Systems
- Application Software
- Internetworking
- Gateways
- Real World Networking
- Host Access
- Wide Area Networking
- Important High-Speed and WAN Technologies
- Global Networking
- Primer Appendix

This primer explains basic networking concepts and technology and also introduces networking terminology to help you better understand the uses and benefits of Novell® products We believe this primer provides a fairly thorough foundation for understanding any network-related discussion Fundamentally understanding networking technology illuminates its potential It also underscores the viability of a smart global network, which will provide virtually everyone a nearly instantaneous digital link to other network users and to seemingly endless information and services

What Is a Computer Network?

A computer network is a collection of devices that can store and manipulate electronic data, interconnected in such a way that network users can store, retrieve, and share information Commonly connected devices include microcomputers, minicomputers, mainframe computers, terminals, printers, various data storage devices, and a host of other equipment

In the near future, as the smart global network becomes a reality, numerous other types of devices will become network connectable, including such home devices as interactive TVs, videophones, and environmental control systems What's more, the devices in your home will eventually give you two-way access to a worldwide network, the Information Superhighway

You can store virtually any kind of information on a computer network, including textual information such as letters and contracts, audio information such as voice messages, and visual images such as facsimiles, photographs, medical x-rays, and even video And, on a network, you can very quickly and easily transmit this information to other people

What Are the Benefits of Computer Networking?

The reasons for networking computers are compelling Having a computer network enables you to combine the skills of different people and the power of different equipment, regardless of the physical locations of the people or the equipment, and by doing so, to benefit enormously

Powerful, Flexible Collaboration

A well-designed computer network enables users to instantaneously and effortlessly collaborate and view, change and exchange information.

For example, a managing editor, writers, associate editors, and artists may need to work together on a publication. With a computer network, they can share the same electronic files, each from his or her own computer, without copying or transferring files If the applications they are using feature even basic integration with the network operating system, they can perform such tasks as opening, viewing, and printing the same file simultaneously

With network-integrated applications, of which you will learn more later, network users will be able to collaborate with an ease and an effectiveness never before experienced For example, multiple users will be able to engage in real-time teleconferencing, talking face-to-face, while simultaneously editing the same document, adding and deleting notes and comments, and viewing each other's notes as they are being created And, they will be able to do this without having to worry about accidentally ruining or deleting the work of others.

To be able to collaborate electronically from widely separate physical locations has significant advantages It frees people from spending considerable time and effort traveling, from communicating by less effective means, and from reconciling the differences in multiple versions of information In short, it frees them from redoing work they would have done correctly in the first place if they had had up-to-date information and instructions

Freedom to Choose the Right Tool

If you choose an open networking environment, this adds another dimension to the information-sharing capabilities inherent in computer networking Open networking products enable users to work on the type of computer best suited to the job they must do, without placing restrictions on their file-sharing capabilities

The design of any particular computer can make it well suited for some tasks and not as well suited for others In an open environment, you can combine many kinds of computers to take advantage of the special strengths of each type of machine For example, Novell network users can use IBM PCs running Windows or DOS, Macintosh computers running a version of the Macintosh operating system, Sun workstations running the UNIX® operating system, and many other types of computers, all on the same network. Scientists, secretaries, doctors, lawyers, writers, editors, artists, engineers--everyone can use the type of computer equipment best suited to the type of work he or she does, yet each can still easily share information with everyone else.

Cost-Effective Equipment Sharing

A very important reason for having a computer network is that it enables users to share equipment

Equipment sharing has significant benefits It enables you to buy equipment with features that you wouldn't otherwise be able to afford and to ensure that the equipment is used to its full potential A correctly implemented network can result in both increased productivity and overall lower costs.

For example, suppose you had a number of unconnected computers. People using these computers would not be able to print unless you purchased a printer for each computer or unless users manually transferred files from computers without printers to those with printers In choosing between these alternatives, you would be choosing between significant expenses for hardware or significant expenses for labor.

But networking the computers would give you other alternatives. Because all users could share any networked printer, you would not need to buy a printer for every computer Therefore, rather than buying numerous inexpensive printers, none of which had top-end productivity features and all of which would sit idle most of the time, you could buy a few inexpensive printers and a few printers with top-end productivity features The more powerful printers might be able to print twenty times the number of pages per minute that inexpensive printers can print And, the more powerful printers might also be able to print in color and to sort, staple, or bind any number of pages into multiple documents.

On a Novell network, all users could share the various printers, accessing whichever printer was most appropriate for the job they were doing The network software would enable users to print whenever they wanted The network would print documents in the order they were received, on the printer the user intended Users would be able to change the order in which documents were to be printed and where they were to be printed whenever necessary

By selecting the right mix of printers and allowing each network user appropriate access to them, you would have enough printing power to take care of the needs of all users, you would ensure that expensive equipment was not standing idle, and you would provide users with the latest, most powerful productivity features, freeing them from many tasks they would otherwise have to do manually--all for a significantly lower cost than if you were to buy separate printers for a number of unconnected computers.

A network enables you to share any networkable equipment or software and realize the same benefits that you would enjoy from sharing printers On a network, users can share modems, data storage devices such as hard disks and CD-ROM drives, data backup devices such as tape drives, E-mail systems, facsimile machines, and all networkable software

Flexible Use of Computing Power

One of the most powerful things a network user can do is simultaneously use the processing power of two or more computers. One method of doing this is remote login. A user working on his or her own computer can simultaneously log in to and use the processing power of another person's computer This makes use of equipment that would otherwise be sitting idle, and it can be done even on computers that are already in use but still have processing power available.

A second method of simultaneously using the processing power of two or more computers is parallel processing, which means distributing the processing required to accomplish one large task to many computers. Some programs are too big to run on individual microcomputers or would run too slowly, but can easily be run at lightning speed when distributed for parallel processing by several networked machines

Secure Management of Sensitive Information

There are other advantages to computer networking that may be even more important than instantaneous, coordinated information sharing and equipment sharing The best networks have extremely powerful security features that enable you to exercise flexible control of who will have access to sensitive data and equipment

Easy, Effective Worldwide Communications

If you choose a networking company with a full suite of products, you will be able to connect computing equipment at distant geographic locations into one cohesive network As a result, you will be able to pass critical data to multiple locations anywhere in the world, almost instantaneously.

Integrated, flexible information sharing, instantaneous information transfer, lower equipment costs, flexible use of computing power, secure management of sensitive information--these are the benefits of computer networking And, these benefits help us produce the results we all are looking for· increased efficiency, productivity, and profitability

Hardware Technology

The purpose of computer networks is to enable users to store and manipulate data so it can be stored, retrieved, and shared To understand how available technology enables us to do this, we need to define a few terms and understand some basic concepts

Definition: Data Versus Information

Although we routinely use the terms "data" and "information" interchangeably, they are not technically the same thing.

Data are entities that convey meaning Computer data is stored as a series of electrical charges arranged in patterns to represent information In other words, data refers to the form of the information (the electrical patterns) It is not the information itself

For our purposes, information will mean decoded data, in human-readable form In other words, information is the real-world, useful form of data For example, the data in an electronic file might be decoded and then displayed on a computer screen or printed onto paper as a business letter

Encoding and Decoding Data

To store meaningful information as data and to retrieve the information, we use an encoding scheme--we agree on a series of electrical patterns that will represent each of the discrete pieces of information we want to store and retrieve. For example, we agree that a particular series of electrical patterns will represent the alphabetic character "A." There are many encoding schemes in use One common data-encoding scheme is ASCII code; an appendix at the end of this primer gives a description of the ASCII data code

To actually encode information into data and later decode that data back into information, we use electronic devices, one of which is the computer, that generate electronic signals Signals are simply the electric or electromagnetic encoding of data Various components in a computer enable it to generate signals to perform the encoding and decoding task.

How Network Data Is Transferred

At the most general, conceptual level, to have a computer network we need only three components First, we need a data code Next, we need computers and auxiliary devices to encode information into data signals and to decode data signals back into information. Finally, we need the means to transfer the signals between the computer devices

Let's suppose we've agreed on a coding scheme and we have several computers that are all capable of encoding and decoding the information we want to save

Now, to have a computer network, we need only the means of transferring the generated signals between the computers To transfer signals between the computers, we need two things. (1) a transmission medium to carry the signals and (2) devices to propagate (send) and receive the signals

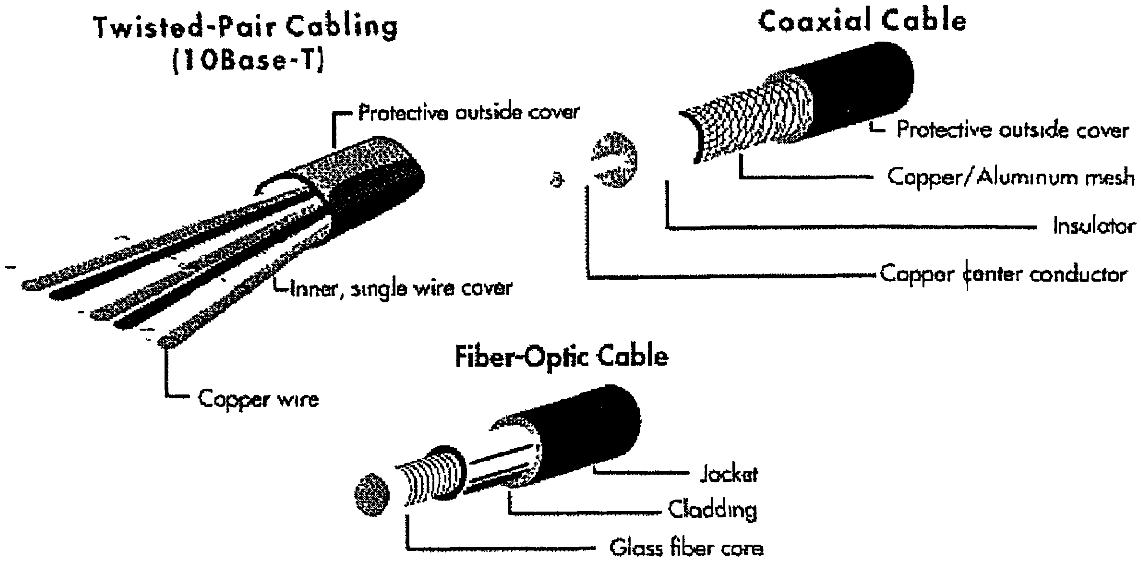
Network Transmission Media

Electrical signals are generated as electromagnetic waves (analog signaling) or as a sequence of voltage pulses (digital signaling) To be propagated (sent) from one location to another, a signal must travel along a physical path The physical path that is used to carry a signal between a signal transmitter and a signal receiver is called the "transmission medium "

There are two types of transmission media guided media and unguided media

Guided media are manufactured so that signals will be confined to a narrow path and will behave predictably Commonly used guided media include twisted-pair wiring, similar to common telephone wiring, coaxial cable, similar to that used for cable TV, and optical fiber cable

Figure 1 Common guided transmission media



Unguided media are natural parts of the existing environment that can be used as physical paths to carry electrical signals Earth's atmosphere and outer space are examples of unguided media that are commonly used to carry signals These media can carry such electromagnetic signals as microwave and infrared light waves.

Regardless of the type of medium, the network signal is transmitted through it as some kind of waveform When transmitted through wire and cable, the signal is an electrical waveform When transmitted through fiber-optic cable, the signal is a light wave, somewhere in the spectrum of visible or infrared light When transmitted through Earth's atmosphere or outer space, the signal can take the form of waves in the radio spectrum, including VHF and microwaves, or it can be light waves, including infrared or visible light (for example, lasers)

When planning a computer network, planners choose a transmission medium, or a combination of media, based on the physical circumstances involved in building the network and the reliability and data-handling performance required of the network The objective is to keep costs to a minimum yet provide all parts of the network with the required reliability and performance

For example, if you needed to build a network consisting of two subnetworks located in separate buildings several miles apart, you might use two or more transmission media If you did not require the same level of performance on both subnetworks, you might use a different type of wire or cable as the transmission medium on each

To connect the two subnetworks across town and ensure a reliable connection even in rain and fog, you might use a third medium, Earth's atmosphere, and connect the subnetworks through a microwave link Or, you might use a T1 or T3 connection T1 and T3 are dedicated lines (basically special telephone lines) that support high-speed communications They can be leased from private companies that specialize in providing communication services

Transmitting and Receiving Devices

Once you have a transmission medium, you need devices that can propagate signals across the medium and devices that can receive the signals when they reach the other end of the medium There are a number of such devices used in computer networking Such devices are designed to propagate a particular type of signal across a particular type of transmission medium Transmitting and receiving devices used in computer networks include network adapters, repeaters, wiring concentrators, hubs, and infrared, microwave, and other radio-band transmitters and receivers.

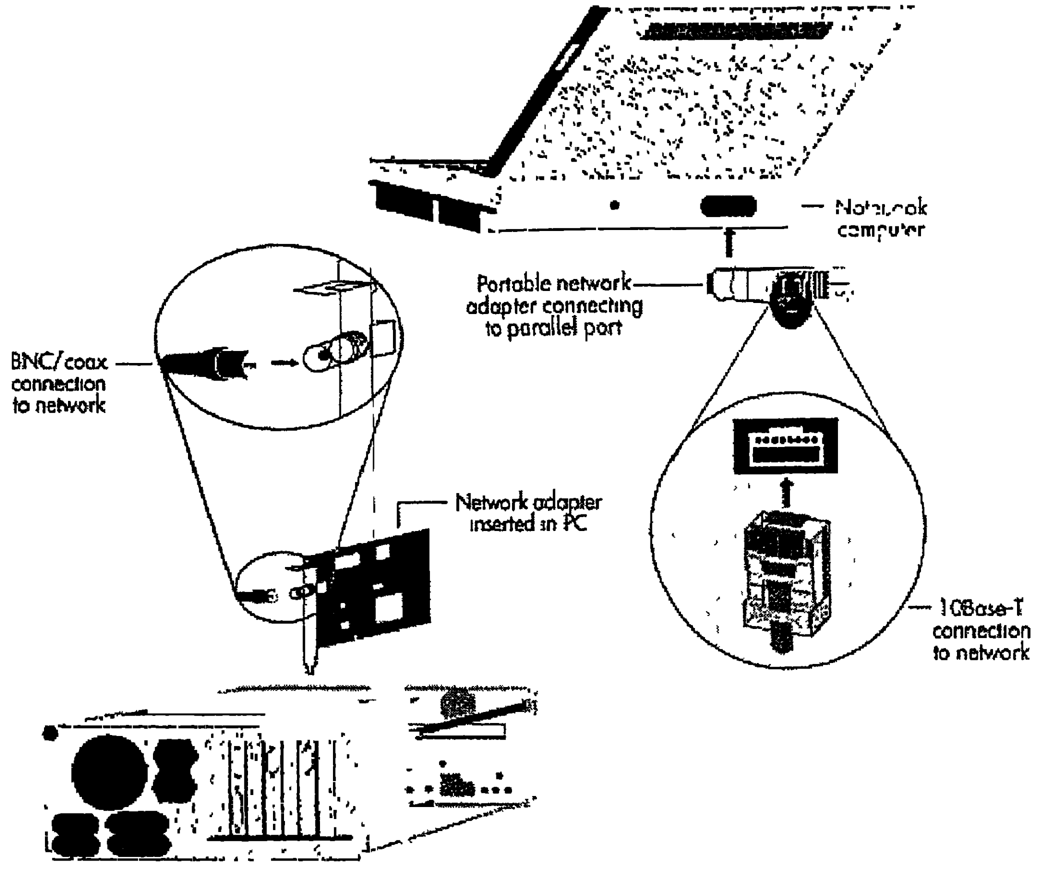
Network Adapters

A network adapter is the hardware installed in computers that enables them to communicate on a network Network adapters are manufactured in a variety of forms The most common form is the printed circuit board, which is designed to be installed directly into a standard expansion slot inside a microcomputer Other network adapters are designed for mobile computing. They are small and lightweight and can be connected to standard connectors on the back of portable (laptop and notebook) computers so that the computer and network adapter can be easily transported from network to network.

Network adapters are manufactured for connection to virtually any type of guided medium, including twisted-pair wire, coaxial cable, and fiber-optic cable They are also manufactured for connection to devices that transmit and receive visible light, infrared light, and radio microwaves, to enable wireless networking across the unguided media of Earth's atmosphere and outer space.

The connection hardware used to make connections between network adapters and different transmission media depends on the type of medium used For example, twist-on BNC connectors are commonly used for connection to coaxial cable, while snap-in telephone-type jacks are ordinarily used for connection to twisted-pair wiring Figure 2 shows two different types of network adapters connected to different computers and media, using different types of connectors

Figure 2: Network adapters are manufactured in a variety of forms, for virtually every kind of communication medium.


Notebook computer
Portable network adapter connecting to parallel port
BNC/coax connection to network
Network adapter inserted in PC
10Base-T connection to network

Repeaters

Repeaters are used to increase the distance over which a network signal can be propagated

As a signal travels through a transmission medium, it encounters resistance and gradually becomes weak and distorted. The technical term for this signal weakening is "attenuation " All signals attenuate, and at some point they become too weak and distorted to be reliably received Repeaters are used to overcome this problem

A simple repeater is a device that receives the network signal and retransmits it at the original transmission strength Repeaters are placed between other transmitting and receiving devices on the transmission medium, at a point where the signal will not have attenuated too much to be reliably received

Repeaters are often built into other, more complex networking devices For example, virtually all network adapters have built-in repeaters Manufacturers of network adapters often manufacture standalone repeaters to be used specifically with their adapters

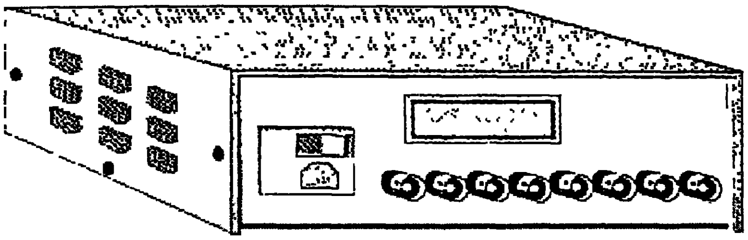
Wiring Concentrators and Hubs

Wiring concentrators and hubs provide a common physical connection point for computing devices in microcomputer networks (We limit this discussion to devices used for making physical connections The term "concentrator" can mean something different in a mainframe or minicomputer environment.) Most hubs and all wiring concentrators have built-in repeaters and thus perform the same signal reception and retransmission function as a repeater (along with other functions)

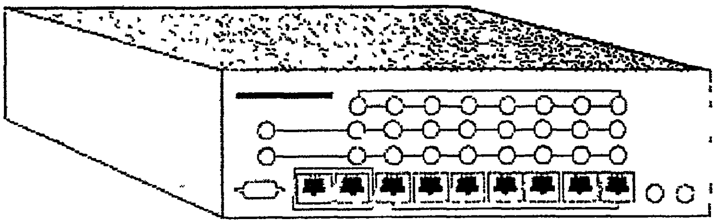
Traditionally, hubs and wiring concentrators have been proprietary, standalone hardware; there are a number of companies that manufacture such hubs and concentrators More recent hub technology is based on hub cards and software that work together in a standard computer

Figure 3 shows two common hardware-based connection devices an ARCnet active hub and an Ethernet 10Base-T concentrator A software-based hub/router is not shown.

Figure 3: ARCnet active hub and Ethernet 10Base-T concentrator.



ARCnet active hub

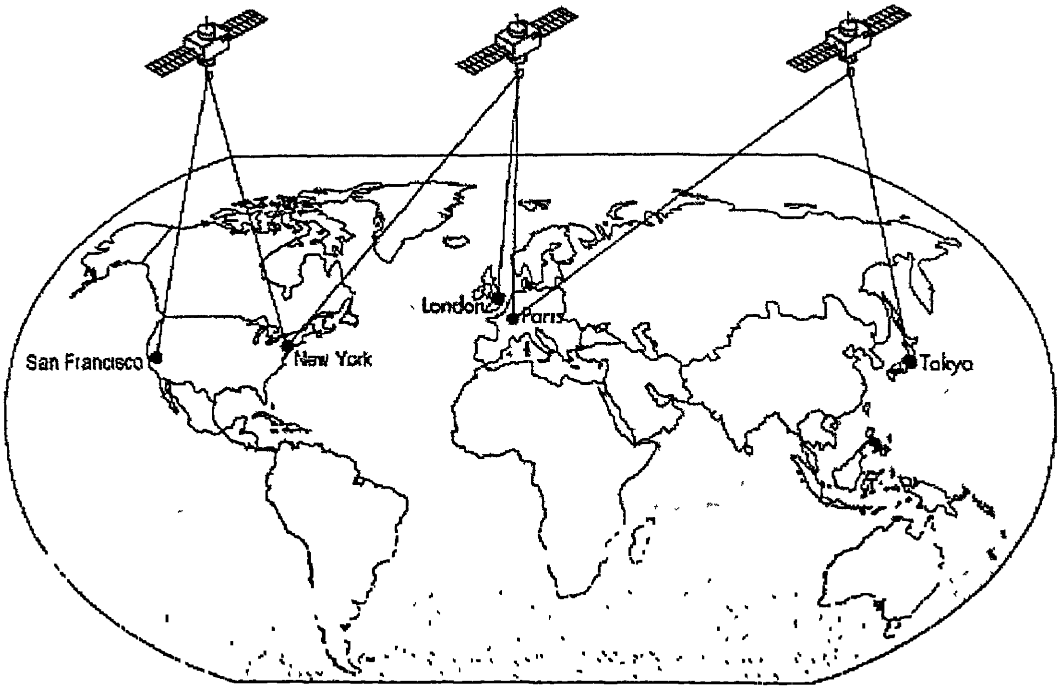


10Base-T concentrator

Microwave Transmitters

Microwave transmitters and receivers, especially satellite systems, are commonly used to transmit network signals over great distances A microwave transmitter uses the atmosphere or outer space as the transmission medium to send the signal to a microwave receiver The microwave receiver either relays the signal to another microwave transmitter, which sends it to another microwave receiver, or the receiving station translates the signal to some other form, such as digital impulses, and sends it along on some other suitable medium Figure 4 shows a satellite microwave link.

Figure 4. Satellite microwave link



Infrared and Laser Transmitters

Infrared and laser transmitters are similar to microwave systems. They use the atmosphere and outer space as the transmission media and require a line-of-sight transmission path The major difference is that they transmit light waves rather than radio waves Infrared and laser transmissions are useful for signaling across short distances where it is impractical to lay cable--for instance, when networks are at sites a few miles apart Because infrared and laser signals are in the light spectrum, rain, fog, and other environmental factors can cause transmission problems

Modems

Modems convert digital (computer) signals to analog (audio) signals, and vice versa, by modulating and demodulating a carrier frequency The most common modems transmit and receive data across ordinary voice-grade telephone lines

A transmitting modem converts (modulates) the encoded data signal to an audible signal and transmits it A modem connected at the other end of the line listens to the audible signal and converts it back into a digital signal (demodulates it) for the computer on the receiving end of the communication link. Modems are commonly used for inexpensive, intermittent communications between geographically isolated computers and a main network

Connecting Network Devices

As we mentioned previously, each transmitting and receiving device is designed for a particular transmission medium

Now that you know what a transmission medium is and have been introduced to transmitting and receiving devices, it will be useful for you to know what a topology is and how it is often different from a network's physical layout

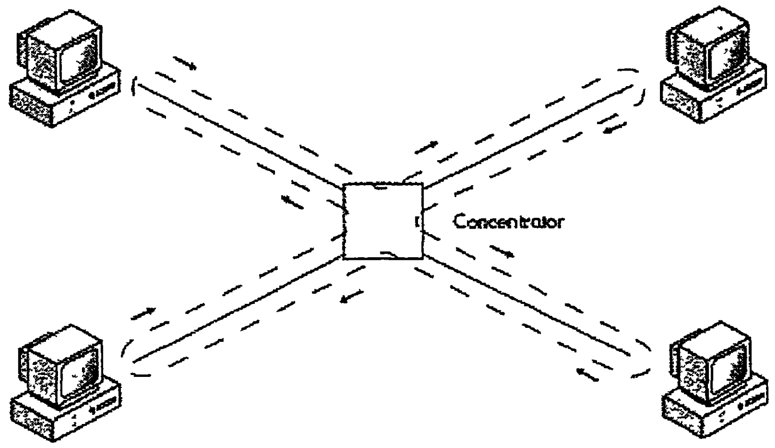
Physical Layout Versus Topology

Physical layout is just what its name implies: It is the way the physical connections between computers are arranged when you look at them For example, in a network connected by some type of wiring, it is the pattern of the wired connections

Topology, on the other hand, refers to the "logical layout" of the network wiring. In more exact terms, it is the way in which the end points of the network are electronically connected The physical layout and the topology of a network are often not the same, and, because the topology of a network is commonly used to describe its type, it is important to understand what a topology is

To illustrate the point, let's first look at the physical layout of a sample network. In Figure 5, the various computers in the network are connected by wiring to a concentrator in a physical star pattern The actual wiring is shown as the solid line between computers When you look at the layout of the wiring, you can easily identify the physical layout of this network It's a physical star

Figure 5: Ring topology network connected as a physical star



Now let's look at the topology of the network. Remember, the topology is the way in which the end points of the network are electronically connected The electronic connection of this network is shown by the dashed line The arrows beside the dashed line show the path that the electrical signal travels in this network If you trace the path of the signal, you will find that it travels in a clockwise direction, around a closed path (a ring) This topology is called a ring (it will be described in more detail in the next section)

How can the signal travel in a circular path when confined to the physical layout? There are various means of accomplishing this There could be two separate wire paths on the inside of the cable Or, there could be one wire path with the inbound and outbound signals traveling on the same wire but on a different frequency However, it's not the method that's important here And, it's not important that the electronic path is not perfectly circular or oval. What's important is that the signal travels around a closed path, in one direction.

The Three Basic Topologies: Star, Bus, and Ring

When it comes to laying out cable, virtually all networks are physically connected in either the star or bus pattern, with the star pattern being most popular, especially recently The reasons for using these two physical layouts are simple Installing cable in these patterns saves cable, initial installation is relatively easy, and it's easy to add workstations later.

There is considerably more variety (and parity) in the use of networking topologies Network designers have worked out three basic topologies, each of which has distinct advantages in specific situations Figure 5 illustrates the ring topology Figures 6 and 7 show the other two basic topologies, the bus and the star As you look at these topologies, remember that the diagrams represent logical, not physical, connections

The Ring Topology

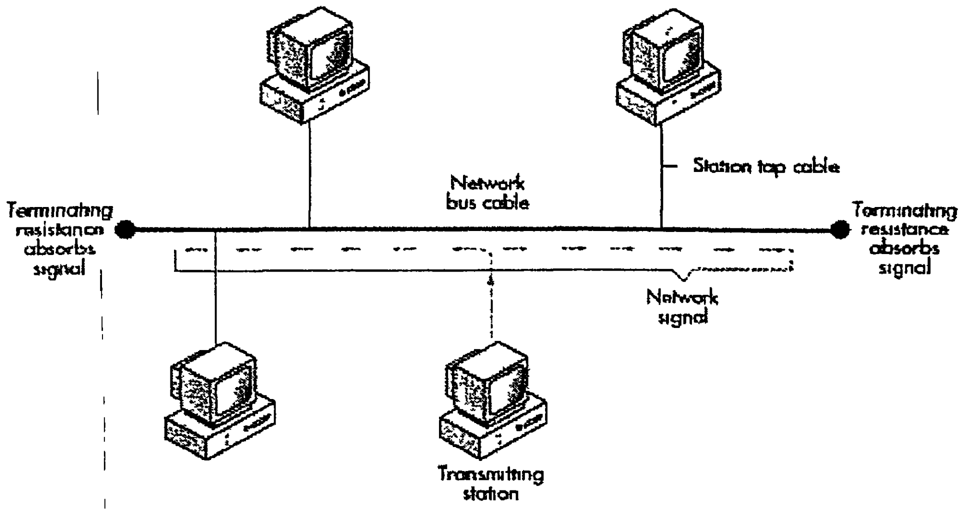
In the ring topology, to which you have already been briefly introduced, the signal path between the network workstations is a closed path (a ring). The signal is transmitted around the ring in one direction. Each workstation receives the signal from the workstation before it and repeats the signal for the next workstation When a workstation transmits data on the ring, it gives the data the address of some other workstation The data is circulated around the ring through each workstation's repeater until it reaches the workstation to which it is addressed and is copied When the signal returns to the workstation from which it was originally transmitted, it is removed from the ring

Ring topology schemes almost always rely on workstations taking turns transmitting This turn taking is controlled by use of a "token " A workstation can transmit only when it is in possession of the token Furthermore, it can have the token only a limited time before it must pass the token to the next workstation This scheme ensures that all workstations get adequate access to the transmission medium. IBM's Token-Ring network is a well-known ring topology network

The Bus Topology

In the bus topology, all workstations are attached to a linear transmission medium that has two ends When a workstation transmits a signal, it travels in both directions from the workstation to both ends of the cable (bus), where it is absorbed (removed from the cable) by appropriate electronics Because the signal travels to all parts of the cable, every workstation receives it The workstation to which the data is addressed copies the data as the signal goes by

Figure 6: Bus topology


Station tap cable
Network bus cable
Terminating resistance absorbs signal
Terminating resistance absorbs signal
Network signal
Transmitting station

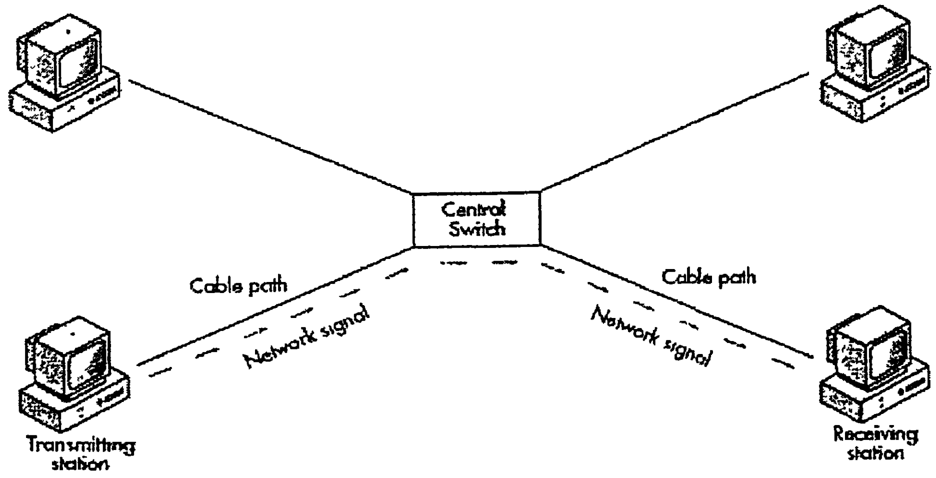
Bus topology schemes rely on either token passing or contention to establish which workstation has access to the transmission medium. The contention scheme works like a telephone party line A workstation "listens" to determine if any other workstation is transmitting on the medium If another workstation is on the medium, the workstation waits a predetermined time and listens again to see if the medium is still busy. When the medium is not busy, the workstation transmits If two workstations transmit at the same time and there is a "collision," both workstations detect the collision and wait a random amount of time before attempting to resend

The bus topology has a variant called the "tree topology " It consists of two or more main (bus) cables emanating from a central point

The Star Topology

In the star topology, each workstation is attached to a common central switch When one workstation transmits a signal to another workstation, the central switch routes the signal from the sending workstation to the receiving workstation, the switch makes decisions regarding destination addresses and switches the signal from line to line

Figure 7: Star topology



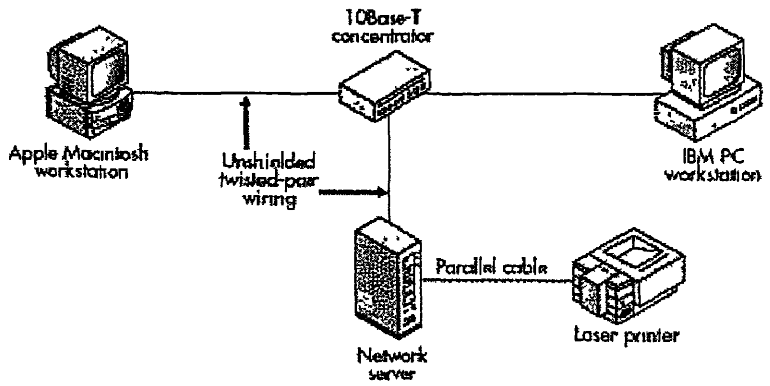
Again, it is important to note that what the network cabling layout looks like probably won't tell you what it acts like electronically You could have a ring topology with either a linear or star physical layout. Or, you could have a bus topology with either a linear or star physical layout. Or, you could have a star topology with a star layout.

In general, a network's physical layout will be determined by the physical layout of the site at which it must be installed and by access to wiring paths A network's topology will be determined by the type of applications to be run on the network and the network performance required to run them most successfully

Connecting a Simple Network

Now that we've seen the hardware pieces that make up a network and discussed the difference between physical layout and topology, let's connect some hardware to form a simple network. Figure 8 shows some of the hardware items we have discussed, connected to form a very basic computer network.

Figure 8: Various networking hardware connected to form a simple network



The network in this illustration includes the following components three computers connected through a 10Base-T concentrator by means of unshielded twisted-pair wiring, three Ethernet 10Base-T network adapters, one installed inside each of the computers, and a laser printer that is connected to one of the computers

The computer at the bottom center of the illustration is a network server; it controls the network (details will be covered in a following section) The other two computers are workstations The workstations use the network under the control of the network server One workstation is an IBM PC and the other is an Apple Macintosh computer.

The 10Base-T concentrator serves as a common connection point for the three computers, it repeats network signals.

The lines between the different components of the network represent the transmission medium, which is twisted-pair wiring This network is connected in a star layout, but it happens to be a bus topology that uses a contention scheme as the means for workstations to get access to the transmission medium

The printer in this network is connected directly to the server by means of a parallel interface cable, which is a standard connection method. The server accepts print jobs from either workstation and sends the jobs through the parallel interface cable to the printer. This is the simplest way to enable both workstations to use the printer. There are other ways to connect printers to a network, including attaching them to a computer set up as a dedicated print server or connecting them to a computer that runs special software enabling it to function as both a workstation and a print server.

Controlling Data Transmission

Once you have the hardware we've discussed so far, you can start connecting the various pieces into a network

But simply connecting hardware doesn't make a computer network Even though the hardware is capable of generating signals and transmitting them across a medium, it must be told when and how to do this There must be network communication software to tell the hardware when and how to transmit The software and hardware on all parts of the network must work together to enable the transmission of data from one networked computer to another. We'll explore various networking software a little later. First let's look at the communication model that is the basis for controlling data transmission on computer networks

To guarantee reliable transmission of data, there must be an agreed method that governs how data is sent and received For example, how does a sending computer indicate which computer it is sending data to? And, if the data will be passed through intervening devices, how are these devices to understand how to handle the data so that it will get to the intended destination? And what if the sending and receiving computers use different data formats and data exchange conventions--how will data be translated to allow its exchange? These are only a few of the questions that must be answered before data can be reliably transmitted and received across a computer network

Understanding the Open Systems Interconnection (OSI) model will allow you to understand how data can be transferred between two networked computers, regardless of whether they are on the same network, or are the same type of computer, or use the same data formats and exchange conventions

ISO and the OSI Model

The OSI model was developed by the International Standards Organization (ISO) as a guideline for developing standards to enable the interconnection of dissimilar computing devices It is important to understand that the OSI model is not itself a communication standard In other words, it is not an agreed method that governs how data is sent and received, it is only a guideline for developing such standards

The OSI Model: What It Is and Why It's Important

It would be difficult to overstate the importance of the OSI model. Virtually all networking vendors and users now understand how important it is that network computing products adhere to and fully support the networking standards the model has spawned. The reasons are logical.

First, when a vendor's products adhere to the standards the OSI model has spawned, connecting those products to other vendors' products is relatively simple Conversely, the further a vendor departs from those standards, the more difficult it becomes to connect that vendor's products to those of other vendors Second, if a vendor were to depart from the communication standards the model has spawned, software development efforts would be very difficult because the vendor would have to build every part of all necessary software, rather than often being able to build on the existing work of other vendors

The first two problems give rise to a third significant problem for vendors A vendor's products become less marketable as they become more difficult to connect with other vendors' products, especially if the introduction of the vendor's products lags behind the general marketplace

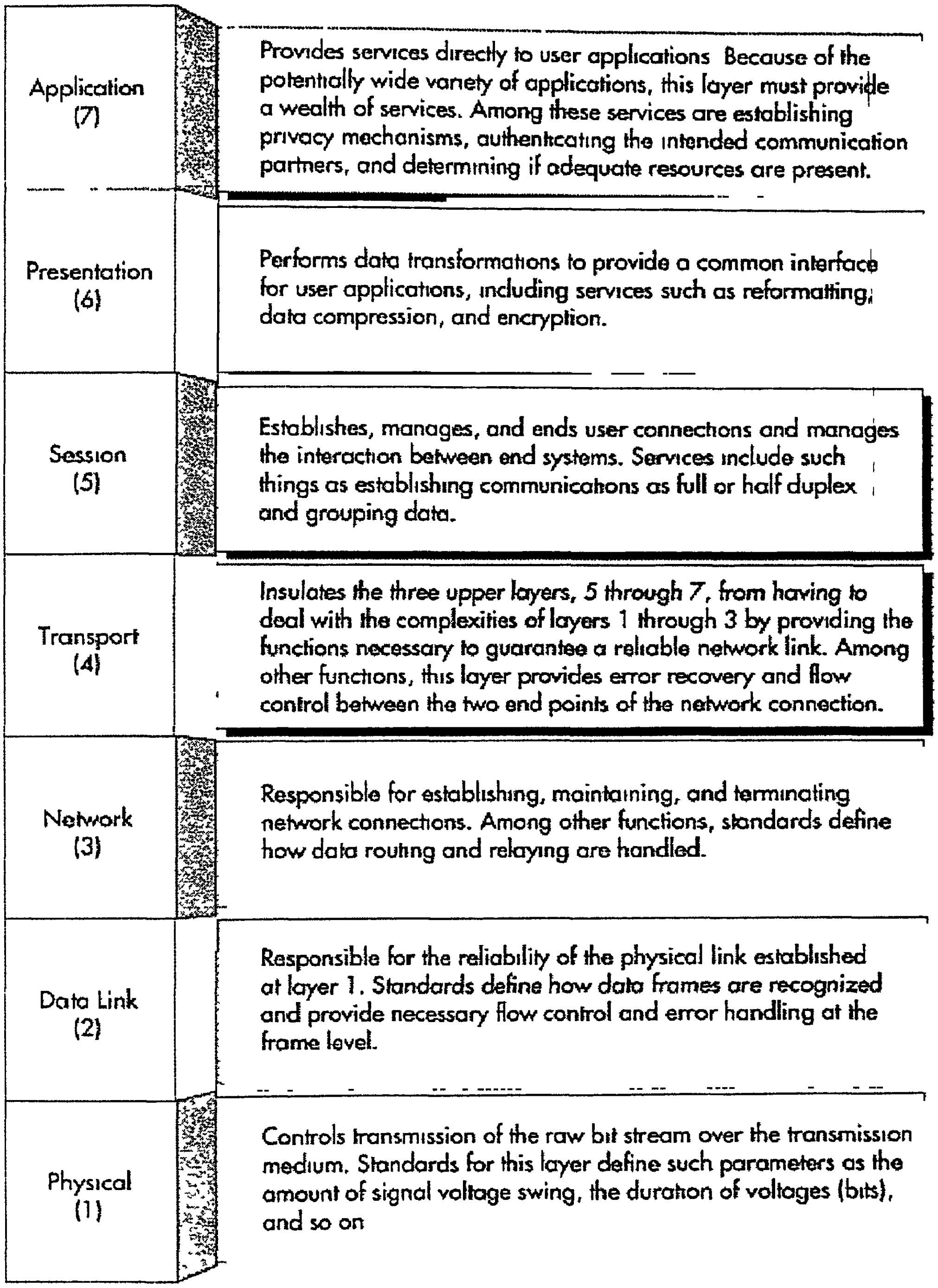
Now, keeping in mind the purpose of the OSI model, let's take a look at its structure

The Seven Layers of the OSI Model

Because the task of controlling communications across a computer network is too complex to be defined by one standard, the ISO divided the task into seven subtasks Thus, the OSI model contains seven layers, each named to correspond to one of the seven defined subtasks

Each layer of the OSI model contains a logically grouped subset of the functions required for controlling network communications. The seven layers of the OSI model and the general purpose of each are shown in Figure 9

Figure 9: The OSI model



Application (7)	Provides services directly to user applications Because of the potentially wide variety of applications, this layer must provide a wealth of services. Among these services are establishing privacy mechanisms, authenticating the intended communication partners, and determining if adequate resources are present.
Presentation (6)	Performs data transformations to provide a common interface for user applications, including services such as reformatting, data compression, and encryption.
Session (5)	Establishes, manages, and ends user connections and manages the interaction between end systems. Services include such things as establishing communications as full or half duplex and grouping data.
Transport (4)	Insulates the three upper layers, 5 through 7, from having to deal with the complexities of layers 1 through 3 by providing the functions necessary to guarantee a reliable network link. Among other functions, this layer provides error recovery and flow control between the two end points of the network connection.
Network (3)	Responsible for establishing, maintaining, and terminating network connections. Among other functions, standards define how data routing and relaying are handled.
Data Link (2)	Responsible for the reliability of the physical link established at layer 1. Standards define how data frames are recognized and provide necessary flow control and error handling at the frame level.
Physical (1)	Controls transmission of the raw bit stream over the transmission medium. Standards for this layer define such parameters as the amount of signal voltage swing, the duration of voltages (bits), and so on

Standards and Protocols

National and international standards organizations have developed standards for each of the seven OSI layers These standards define methods for controlling the communication functions of one or more layers of the OSI model and, if necessary, for interfacing those functions to the layer above and below.

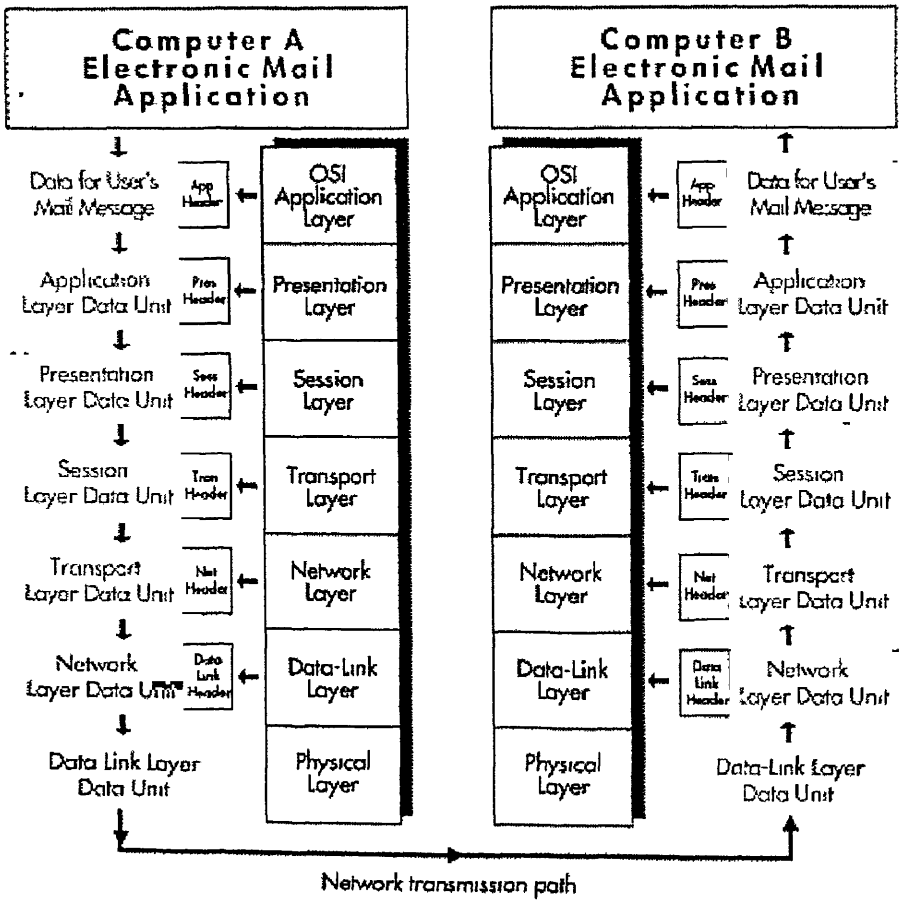
A standard for any layer of the OSI model specifies the communication services to be provided and a protocol that will be used as a means to provide those services. A protocol is a set of rules that two network workstations must follow (at any OSI layer) to communicate It consists of the control functions, the control codes, and the procedures necessary for successfully transferring data.

For every layer of the OSI model, there is more than one protocol standard. This is because a number of standards were proposed for each layer and because the various organizations that defined those standards--specifically, the standards committees inside these organizations--decided that more than one of the proposed standards had real merits Thus, they allowed for the use of different standards to satisfy different networking needs

Network Communications Through the OSI Model

Using the seven layers of the OSI model, we can explore more fully how data can be transferred between two networked computers Figure 10 uses the OSI model to illustrate how such communications are accomplished.

Figure 10: Networked computers communicating through the OSI model


Computer A Electronic Mail Application
Computer B Electronic Mail Application
Data for User's Mail Message
App Header
OSI Application Layer
Application Layer Data Unit
Pres Header
Presentation Layer
Presentation Layer Data Unit
Sess Header
Session Layer
Session Layer Data Unit
Tran Header
Transport Layer
Transport Layer Data Unit
Net Header
Network Layer
Network Layer Data Unit
Data Link Header
Data-Link Layer
Data Link Layer Data Unit
Physical Layer
Network transmission path

Our figure represents two networked computers, each of which is running various pieces of software (most not shown). Running together, the various pieces of software implement the seven OSI layers These computers are identical They are running identical software, and they are using identical protocols at all OSI layers Above the OSI application layer, each computer is running an E-mail program The E-mail program enables the users of the two computers to exchange messages Our figure represents the transmission of one brief message from computer A to computer B.

The transmission starts with the user of computer A pressing a key to send a mail message to the user of computer B The E-mail application is designed to talk to the OSI application layer--it knows the proper protocol for doing so. The E-mail application transfers the message to the OSI application layer Using the functions built into its protocol, the application layer accepts the message data and adds an application layer header to it The application layer header contains the information necessary for the application layer in computer B to correctly handle the data when computer B receives it.

After adding its header, the application layer in computer A passes the data to the presentation layer below. The presentation layer treats everything received as data, including the application layer header, and appends its own header (the technical term for this is "encapsulation"). The presentation layer header contains the information necessary for the presentation layer in computer B to correctly handle the data After adding its header, the presentation layer transfers the new data unit to the session layer

This process is repeated through all layers in computer A until a final header is added at the data-link layer. After the data-link layer header is added, the data unit is known as a "frame." The data, or frame, is passed from the data-link layer to the physical layer and is transmitted across the transmission medium connecting the two computers.

When the signal reaches computer B, layer one in computer B (the physical layer) copies the data. Now the process is reversed The physical layer in computer B transfers the data to the data-link layer The data-link layer removes the header information that was attached by the corresponding layer in computer A, acts upon the information the header contains, and transfers the data unit up to the network layer This process continues, with the headers being stripped off at each layer and the instructions contained therein carried out, until the original data from computer A (the message) is finally passed from the application layer to the E-mail application in computer B When the E-mail application receives the message, it displays the message on the screen for the user of computer B to read

Now look at Figure 10 and imagine what would be possible if the software implementing different layers of the OSI model were able to handle not just one communication protocol at any one layer, but almost any communication protocol used at any layer, by any computer--there would be no limits to the interconnection of dissimilar computing devices This is the kind of power that will be the basis for a smart global network--the networking of all kinds of business and personal devices into the Information Superhighway And this is the kind of power built into NetWare® products

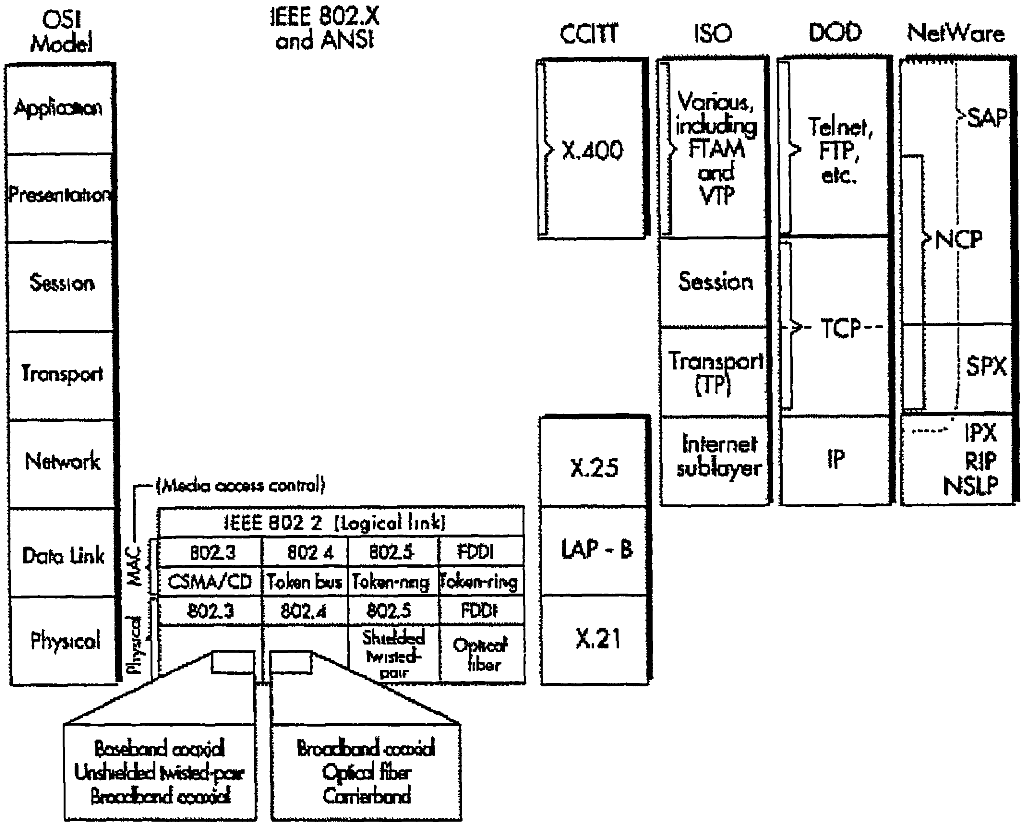
Commonly Used Standards

When you read about NetWare products, you will find references to various standards and communication protocols supported by NetWare networks.

To understand the capabilities of NetWare products, it will help to know the OSI layer at which a particular protocol operates and why the standard is important As you shall see later, by converting protocols or using multiple protocols at different layers of the OSI model, it is possible to enable different computer systems to share data, even if they use different software applications, operating systems, and data-encoding techniques.

Figure 11 shows some commonly used standards and the OSI layer at which they operate.

Figure 11: Important standards at various OSI layers



Layer-One Standards: Physical

Standards at the physical layer include protocols for transmitting a bit stream over media such as baseband coaxial cable, unshielded twisted-pair wiring, and optical fiber cable The most commonly used are those specified in the Institute of Electrical and Electronic Engineers (IEEE) 802.3, 802 4, and 802 5 standards and the American National Standards Institute (ANSI) Fiber Distributed Data Interface (FDDI) standard Figure 11 shows the transmission media included in each of these standards An emerging standard for this layer is the Synchronous Optical Network (SONET)

Layer-Two Standards: Data Link (Media Access Control and Logical Link Control)

The most commonly used layer-two protocols are those specified in the IEEE's 802 2, 802.3, 802 4, and 802 5 standards and the ANSI FDDI standard Almost all microcomputer networking products use one of these standards (or the virtually identical ISO version) at layer two Important technologies at this layer include 100Base-T, 100VG-AnyLAN, frame relay, and Asynchronous Transfer Mode (ATM) Layer-two standards encompass two sublayers· media access control and logical link control

Media Access Control

The media access control (MAC) protocol specifies how workstations cooperatively share the transmission medium.

The IEEE 802.3 standard specifies a medium-access method known as "carrier sense multiple access with collision detection (CSMA/CD) " This medium-access method is the same as the contention method described earlier under the heading "The Bus Topology."

The IEEE 802.4, 802 5, and FDDI standards all specify some form of token passing as the media access control method The basics of the token-passing method were also described earlier, under the heading "The Ring Topology."

In general, using a form of token passing for the media access control works best when large numbers of computers frequently send small amounts of data--for example, when a number of workstations continually read and write small records to and from a database. Contention schemes work well when computers send large amounts of data intermittently--for example, during desktop publishing or document imaging.

Logical Link Control

The function of the logical link control layer is to ensure the reliability of the physical connection

The IEEE 802.2 standard is the most commonly used logical link control standard

The Point-to-Point Protocol (PPP) is an important standard at this OSI level. PPP is used for communications across point-to-point links such as T1 and T3 lines. It is an important protocol for wide area networking, which will be covered later.

Layer-Three Standards: Network

The function of the network layer is to manage communications, most importantly the routing and relaying of data, between workstations

One important network-layer standard is the Department of Defense (DOD) Internet Protocol (IP) specification, which is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) standard developed by the DOD This protocol is important for two reasons· (1) In most cases, the Department of Defense will not purchase networking products that cannot communicate using this protocol, and (2) The protocol is becoming increasingly popular with all users of network computing, including private businesses and institutions of higher education.

Because Novell commands a large share of the networking market, its native network-layer protocol, Internetwork Packet Exchange™ (IPX™), is also an important network-layer standard IPX is a connectionless datagram protocol. A connectionless protocol does not need to establish a connection between two networked computers to transfer information between them Packet acknowledgment, or connection control, is provided by protocols above IPX, such as Novell's Sequenced Packet Exchange™ (SPX™) (SPX will be explained in more detail in a later section). Also, because IPX is a datagram protocol, each communication packet is treated as an individual entity. IPX does not have to establish a logical or sequential relation between packets Thus, because it is a connectionless datagram protocol, IPX is very efficient--it addresses and transfers data with minimum control overhead.

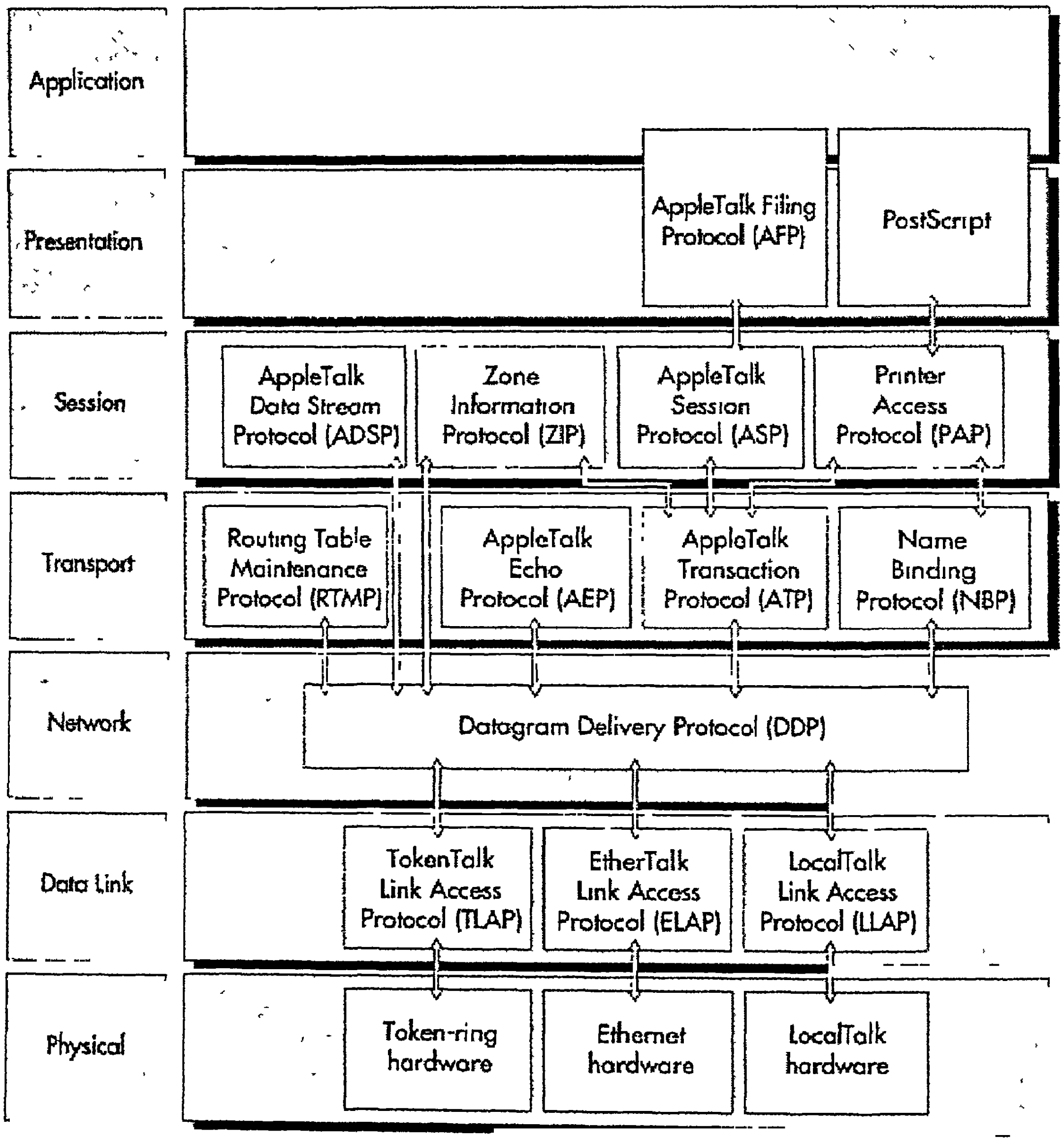
IPX uses other NetWare protocols that work at the network layer to accomplish internetwork routing These protocols, the Routing Information Protocol (RIP), the Service Advertising Protocol (SAP), and the NetWare Link Services Protocol™

(NLSP™), will be explained in more detail in a later section.

The Consultative Committee for International Telegraph and Telephone (CCITT) X.25 standard is another commonly used network-layer standard It specifies the interface for connecting computers on different networks by means of an intermediate connection made through a packet-switched network (for example, a common carrier network such as CompuServe, Tymnet, or Telnet) The X 25 standard includes the data-link and physical-layer protocols shown below it in Figure 11

Apple Computer, Inc has established a set of protocols for its products, referred to collectively as AppleTalk. At the network layer of the OSI model, the Apple protocol is called Datagram Delivery Protocol. Figure 12 shows how the set of AppleTalk protocols fits within the OSI model.

Figure 12: Where AppleTalk protocols fit in the OSI model


Application
Presentation
Session
Transport
Network
Data Link
Physical
AppleTalk Filing Protocol (AFP)
PostScript
AppleTalk Data Stream Protocol (ADSP)
Zone Information Protocol (ZIP)
AppleTalk Session Protocol (ASP)
Printer Access Protocol (PAP)
Routing Table Maintenance Protocol (RTMP)
AppleTalk Echo Protocol (AEP)
AppleTalk Transaction Protocol (ATP)
Name Binding Protocol (NBP)
Datagram Delivery Protocol (DDP)
TokenTalk Link Access Protocol (TLAP)
EtherTalk Link Access Protocol (ELAP)
LocalTalk Link Access Protocol (LLAP)
Token-ring hardware
Ethernet hardware
LocalTalk hardware

Like Novell's native protocols, Apple's standard protocols are important because of

Apple's wide acceptance in the microcomputer market

Layer-Four Standards: Transport

Standards at this OSI layer provide for the reliability of the end-to-end communication link. This layer isolates the upper three layers, which are all concerned with user and application requirements. from knowing the details required to manage the end-to-end connection.

The ISO has issued a transport-layer standard that is simply called the Transport Protocol (TP) Because it is an ISO standard. it is of worldwide importance

At the transport layer, Novell's native protocol is SPX SPX provides guaranteed packet delivery and packet sequencing Although it is basically a transport-layer protocol, it also includes session-layer functions The NetWare Core Protocol™ (NCP™) and SAP also provide transport-layer functions SPX, NCP, and SAP will be treated in more detail in a later section.

The AppleTalk protocol set has a number of protocols that operate at the transport layer, including Routing Table Maintenance Protocol, AppleTalk Echo Protocol, AppleTalk Transaction Protocol, and the Name Binding Protocol

IBM's NetBIOS protocol (not shown in Figure 11) is also an important protocol at this layer and at the session layer above

The DOD's Transmission Control Protocol, which is part of the TCP/IP standard, is important at the transport layer in the same degree and for the same reasons as the IP standard at layer three. This protocol provides all functions required for this layer (transport) and part of the functions for the session layer above.

Layer-Five Standards: Session

The function of the session layer is to establish, manage, and terminate the connections of individual network users.

The ISO session standard, named simply "session," has the same worldwide importance as the ISO transport standard The DOD's Transmission Control Protocol, the importance of which was stated previously, performs important functions at this layer.

In a NetWare environment, the NetWare Core Protocol provides most of the necessary session-layer functions SAP also provides functions at this layer.

Layer-Six and Layer-Seven Standards: Presentation and Application

The presentation layer performs general data transformations useful to a variety of applications, thus providing a useful common interface Presentation-layer services include data encryption and text compression The application layer provides user applications with basic (yet complete) services such as file transfer and network management functions

Two important OSI protocols encompassing both the presentation and application layers are File Transfer, Access, and Management (FTAM) and Virtual Terminal Protocol (VTP). Each of these protocols is exactly what its name implies. FTAM provides user applications with useful file transfer and management functions VTP supports applications by converting specific terminal characteristics to a general (virtual) terminal model shared by applications

X 400 is an important CCITT standard that encompasses both the presentation and application layers X 400 provides message handling and E-mail services It is an important standard because it is the basis for a number of pervasive E-mail packages as well as for other widely used messaging products

An important DOD standard at this level is File Transfer Protocol, which, again, is named for the service it provides.

The NetWare protocols that provide presentation- and application-layer functions are NCP and SAP All NetWare protocols will be treated in more detail in a later section

Further Perspective: Standards and Open Systems

You probably noticed from looking at Figures 11 and 12 that most accepted standards are not neatly packaged to include all (and only) those services specified for any OSI layer In fact, most common standards encompass parts of multiple OSI layers This includes most standards adopted by the various government agencies that develop them

Product vendors' actual implementation of OSI layers is even less neatly divided Vendors implement accepted standards, which already include mixed services from multiple layers, in different ways

So why go to all the trouble to agree on a model and then define standards if you are not going to be exact when fitting the standards to the model or in implementing the standards when building a product?

Actually, standards development and implementation have proceeded more or less as expected The OSI model was never intended to foster a rigid, unbreakable set of rules It was expected that in implementing the OSI communication model, networking vendors would be free to use whichever standard for each layer they deemed most appropriate They would also be free to implement each standard in the manner best suited for the purposes of their products

As noted earlier, however, it is clearly in a vendor's best interest to manufacture products that conform to the intentions behind the OSI model To do this, a vendor must provide the services required at each OSI model layer in a manner that will enable its system to be simply and easily connected to the systems of other vendors--in other words, vendors must develop open systems The consequences of not doing so are severe and unavoidable

Which leads to the next issue--how do you determine if a system is an open system? You can start by getting answers to simple questions such as: (1) Can you establish communications using virtually any accepted communication standard? and (2) How easily can you do this? For example, can you communicate with other networks that are using the TCP/IP protocol, even if your network uses some other protocol at that layer? If you can communicate, what kind of effort is required? And how reliable are such communications?

As you begin asking questions like these, you will find that Novell has the answers you need NetWare products support every standard we have presented, as well as virtually every other accepted standard. The more you understand NetWare products, the more you will understand that no system is more open than a NetWare system

The Network Operating System

From our discussion of the OSI model, you have no doubt begun to understand how complex it is to control communications on a computer network. And, you are probably wondering· What is the means of accomplishing this task? The answer is software called the network operating system

The network operating system software acts as the command center, enabling all of the network hardware and all other network software to function together as one cohesive, organized system In other words, the network operating system is the very heart of the network

Client-Server Network Operating Systems

On a client-server network, the network operating system (NOS) is installed and runs on a computer called the network server (see Figure 8). The server must be a specific type of computer For example, the most commonly used client-server version of the NetWare network operating system runs on IBM PC and compatible computers

A client-server operating system is responsible for coordinating the use of all resources and services available from the server on which it is running

The client part of a client-server network is any other network device or process that makes requests to use server resources and services For example, network users at workstations request the use of services and resources though client software, which runs in the workstation and talks to the operating system in the server by means of a common protocol

On a NetWare client-server network, users "log in" to the network server from the workstation To log in, a user enters a login command and gives his or her user name and password If the user name and password are valid, the server logs the user in and allows him or her access to all services and resources to which he or she has been granted rights. As long as the user has proper rights, the client-server operating system provides the services or resources requested by the distributed applications running in workstations

The operating system manages various server resources, which include hardware such as hard disks, RAM, printers, and equipment used for remote communications, such as modems The network file system is also a server resource.

In addition, the network operating system provides many services, including coordinating file access and file sharing (including file and record locking), managing server memory, managing data security, scheduling tasks for processing, coordinating printer access, and managing internetwork communications

Among the most important functions performed by a client-server operating system are ensuring the reliability of data stored on the server and managing server security.

There are many other functions that can and should be performed by a network operating system. We do not have room to cover them all here. However, many functions might be very important to you, and this means that choosing the right NOS is of paramount importance NetWare NOSs are robust systems that provide many capabilities not found in less mature systems. NetWare NOSs also provide a level of performance and reliability far above that found in most other network operating systems

To learn more about client-server operating systems, including the services they can and should provide, read the sections that cover the NetWare client-server operating systems, including the NetWare 4 11 NOS, NetWare 4 11 for OS/2, the NetWare 3 12 NOS, and NetWare 4 11 SFT III.

Peer-to-Peer Network Operating Systems

Peer-to-peer network operating systems enable networked computers to function as both a server and a workstation. In a peer-to-peer network, the operating system is installed on every networked computer; this enables any networked computer to provide resources and services to all other networked computers For example, each networked computer can allow other computers to access its files and use connected printers while it is in use as a workstation

Peer-to-peer operating systems have both advantages and disadvantages when compared to client-server operating systems. They provide many of the same resources and services as do client-server operating systems, and, under the right circumstances, can provide good performance. They are also easy to install and are usually inexpensive

However, peer-to-peer networks provide fewer services than client-server operating systems Also, the services they provide are a great deal less robust than those provided by mature, full-featured client-server operating systems, and the performance of peer-to-peer networks commonly decreases significantly under a heavy load. Furthermore, except in the case of Novell's Personal NetWare™ peer-to-peer network operating system, maintenance is often more difficult. Because there is no method of centralized management, there are often many servers to manage (rather than one centralized server), and many people may have access to and the ability to change the configuration of different server computers

For more information about the differences between peer-to-peer and client-server networks and the level of services they offer, refer to the Personal NetWare product description

Desktop Operating Systems

Each workstation on the network must have software that manages its own resources This software, known as the desktop operating system, enables a workstation to perform such functions as accessing files from its own local hard disks, displaying information on its video display, coordinating local printing, and so on

There are a number of commonly used desktop operating systems, including Windows, Windows NT, UNIX, PC-DOS, OS/2, MS-DOS, and various versions of the Macintosh operating system

Each of the different desktop operating systems has advantages and disadvantages

Unfortunately, for the most part, they are not compatible with each other Software written for one operating system will not function on another Furthermore, peripheral hardware (such as modems, facsimile machines, and so on) that is compatible with the hardware required to run one kind of desktop operating system is usually not compatible with hardware required to run other desktop operating systems

This brings us to another important function of a network operating system--it should be able to interconnect all of the commonly used desktop operating systems to ensure that all network users have access to the computer that they are most familiar with and that is best suited to the job they need to do

Novell network operating systems enable you to integrate all popular desktop operating systems directly on one network They allow this because they are able to translate the data from one desktop operating system into data that the other desktop operating systems can read

Application Software

Once you have your network hardware, a powerful network operating system, and the necessary desktop operating system(s), the final network tool you will need is application software. Application software enables you to do the "real work" you want to do. Commonly used application software includes word processing, accounting, spreadsheet, and database programs You may also need customized applications, or even one-of-a-kind applications, built specifically for your company.

One extremely important issue to consider when selecting commercially built application software is its degree of network integration To effectively use network services, application software must be well integrated with the network operating system The degree of network integration will determine how well the application enables collaboration among network users, whether and how well it provides direct access to all network services, and whether it is as easy as it can be to manage across the network

Internetworking

As businesses grow, they often need more than one network In fact, even a modest-sized business often has several networks operating, each serving a specific portion of the organization.

Why might a business need more than one network?

First, even the fastest and most efficient network can become overloaded with more users and data than it can easily handle By adding another network, you can split the workload and restore responsiveness Second, confidential information--payroll and human resources information, for example--can be kept more securely if stored on its own network Third, having several networks helps ensure that a single failure will not bring the entire organization to a halt You can duplicate on different networks software and data required to continue critical functions If the primary network fails, you can simply log in to backup networks and continue as before

Whatever the reason for having more than one network, it often becomes necessary to connect separate networks to share information between them When two or more networks are connected, the result is called an internetwork; each of the connected networks is a subnetwork

Internetworking includes everything from connecting two small workgroup networks, each with perhaps two or three workstations, to connecting thousands of computers--from notebook computers to mainframes--on tens to hundreds of individual subnetworks in a worldwide organization

Internetworking Devices: Bridges and Routers

Bridges and routers are the devices used to interconnect networks They can be primarily hardware based or primarily software based.

Software-based routers and bridges can be part of a server's operating system or can at least run in the server with the operating system. Software-based bridges and routers can also be installed on standard computers to create dedicated, standalone devices For example, NetWare MultiProtocol Router™ software is a family of software-based routing products that can be installed on either a NetWare 3™ or NetWare 4™ server or on a standalone PC

To understand internetworking, it is not essential that you understand all the technical differences between a bridge and router In fact, without some study, this can be a confusing area For example, if you read about NetWare MultiProtocol Routers, you will find that these routers also perform what is called source-route bridging

However, without a basic understanding of bridging and routing technology (and related terminology), you will find it difficult to understand the capabilities of some products and the reasons such capabilities are useful or important. Please keep in mind throughout the following discussion that bridges and routers have one important thing in common They both allow the transfer of data packets (frames) between networks with different network addresses.

Bridges

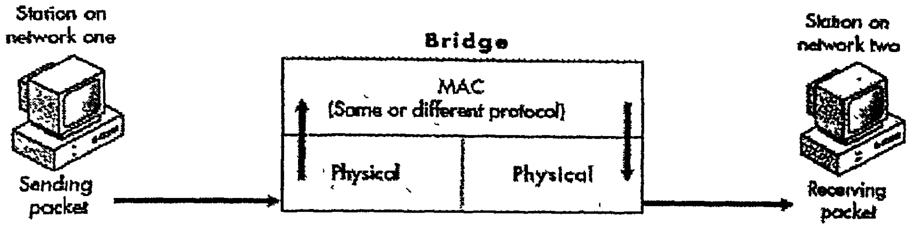
A bridge operates at the data-link layer (layer two) of the OSI model Bridges can be used to connect networks with different addresses or to segment a network (segments having the same network address) When connecting networks with different addresses, a bridge acts as an address filter, it relays data between networks with different addresses based on information contained at the media access control level

Simple bridges are used to connect networks that use the same physical-layer protocol and the same MAC and logical link protocols (OSI layers one and two) Simple bridges are not capable of translating between different protocols.

Other types of bridges, such as translational bridges, can connect networks that use different layer-one and MAC-level protocols, they are capable of translating, then relaying, frames

After a physical connection is made (at OSI layer one), a bridge receives all frames from each of the networks it connects, and it checks the network address of each received frame The network address is contained in the MAC header. When a bridge receives a frame from one network that is addressed to a workstation on another network, it passes the frame to the intended network Figure 13 illustrates, in a general fashion, how a bridge relays frames between networks

Figure 13: Internetworking through a bridge



A bridge assumes that all communication protocols used above the data-link layer at which it operates (OSI layers three through seven) are the same on both sides of the communication link. Of course, this must be true, or there must be translation between unlike protocols at layers three through seven for the receiving computer to be able to interpret the transferred data.

Spanning Trees and Source-Route Bridging

There are two terms connected with bridging that will be useful to understand: spanning trees and source-route bridging

Spanning trees prevent problems resulting from the interconnection of multiple networks by means of parallel transmission paths. In various bridging circumstances, it is possible to have multiple transmission routes between computers on different networks If multiple transmission routes exist, unless there is an efficient method for specifying only one route, it is possible to have an endless duplication and expansion of routing errors that will saturate the network with useless transmissions, quickly disabling it Spanning trees are the method used to specify one, and only one, transmission route.

Source-route bridging is a means of determining the path used to transfer data from one workstation to another Workstations that use source routing participate in route discovery and specify the route to be used for each transmitted packet. Source-route bridges merely carry out the routing instructions placed into each data packet when the packet is assembled by the sending workstation--hence the name "source routing." In discussions of bridging and routing, do not be confused by the term "source routing " Though it includes the term "routing," it is a part of bridging technology Source-route bridging is important because it is a bridge-routing method used on IBM Token-Ring networks.

You should understand that bridging technologies and routing methods can be combined in various ways For example, there is an IEEE specification for a source-route transparent bridge, a bridging scheme that merges source-route bridging and transparent bridging in one device

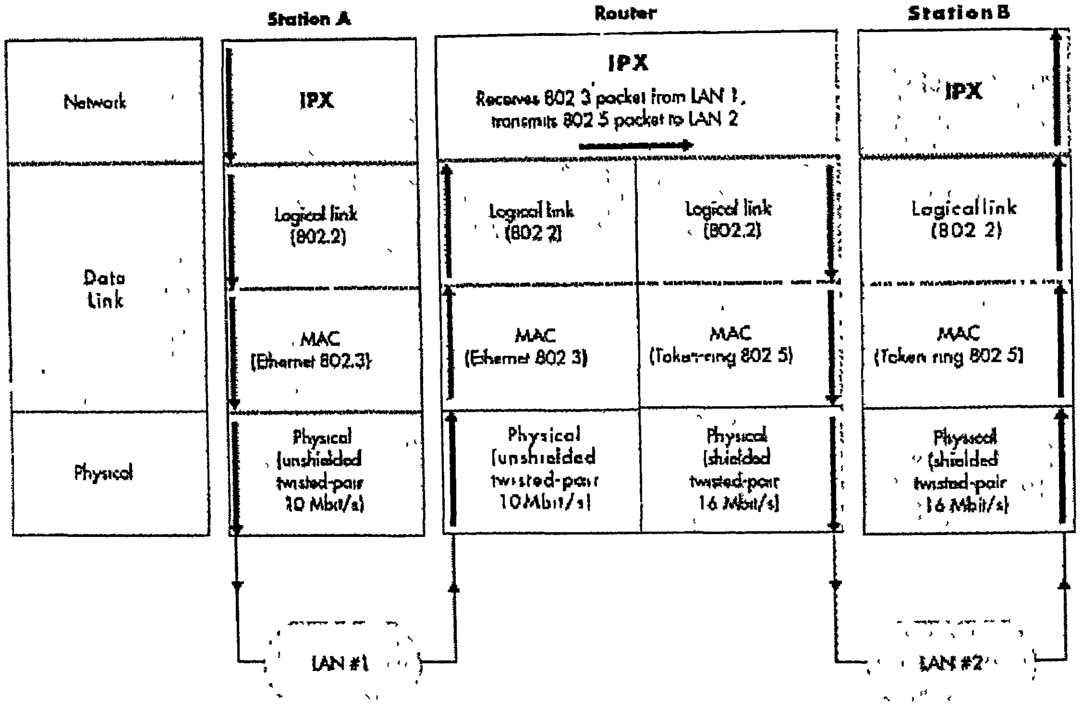
From this simple discussion of bridging, one thing should be apparent When picking internetworking products, it is important to select those that support the various bridging methods--products such as NetWare MultiProtocol Routers (For further details, see the NetWare MultiProtocol Router 3 1 section)

Routers

Routers function at the network layer of the OSI model (one layer above bridges) To communicate, routers must use the same network-layer protocol And, of course, the sending and receiving workstations on different networks must either share identical protocols at all OSI layers above layer three, or there must be necessary protocol translation at these layers.

Like some bridges, routers can allow the transfer of data between networks that use different protocols at OSI layers one and two (the physical layer and the data-link layer, which includes sublayers for media access control and logical link control). Routers can receive, reformat, and retransmit data packets assembled by different layer-one and layer-two protocols Different routers are built to manage different protocol sets Figure 14 illustrates how a router transfers data packets.

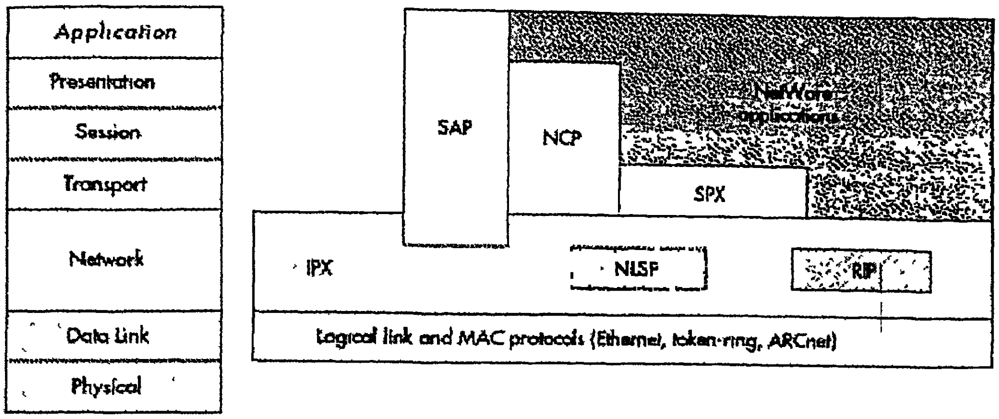
Figure 14: Internetworking through a router


Station A
Router
Station B
Network
Data Link
Physical
IPX
Receives 802.3 packet from LAN 1, transmits 802.5 packet to LAN 2
IPX
IPX
Logical link (802.2)
Logical link (802.2)
Logical link (802.2)
Logical link (802 2)
MAC (Ethernet 802.3)
MAC (Ethernet 802 3)
MAC (Token-ring 802 5)
MAC (Token ring 802 5)
Physical (unshielded twisted-pair 10 Mbit/s)
Physical (unshielded twisted-pair 10Mbit/s)
Physical (shielded twisted-pair 16 Mbit/s)
Physical (shielded twisted-pair 16 Mbit/s)
LAN #1
LAN #2

NetWare Internetworking Protocols

Before we conclude with a discussion of host connection, wide area networking and technologies, and global networks, you should understand a little more about native NetWare protocols that play a role in NetWare internetworking Figure 15 shows in greater detail how NetWare protocols fit into the OSI model

Figure 15. Where NetWare protocols fit in the OSI model



Each of the native NetWare protocols shown in Figure 15 plays a role in NetWare internetworking, either directly or indirectly.

IPX: The Network Layer Protocol

In conjunction with industry-standard media access control protocols, the NetWare IPX protocol provides the NetWare addressing mechanism that delivers communication packets to their destination. IPX works with all important MAC standards As you can see from Figure 15, IPX operates at the network layer of the OSI model

In a NetWare environment, internetwork packet routing is accomplished at the network layer. Thus, IPX is the NetWare protocol that addresses and routes packets between internetworked computers.

IPX bases its routing decisions on the address fields in its packet header (provided by the MAC protocol) and on the information it receives from other NetWare protocols For example, IPX uses information supplied by either RIP or NLSP to forward packets to the destination computer or to the next router IPX also uses SAP

RIP and NLSP: The Routing Protocols

NetWare routers use one of two routing protocols, RIP or NLSP, to exchange routing information with neighboring routers.

RIP: A Distance-Vector Routing Protocol

The NetWare RIP is a distance-vector protocol Distance-vector routing protocols are the traditional method used for router communications

In an internetwork using distance-vector routing, routers periodically determine if the internetwork configuration has changed They also periodically broadcast packets to their immediate neighbors; these packets contain all information they currently have about the internetwork's topology

After receiving any information, distance-vector routers consolidate the information and pass summarized data along to other routers, servers, and end devices, such as printers and workstations Through this periodic checking and broadcasting, which is performed at regular intervals regardless of whether the internetwork has changed, all routers are kept

updated with correct internetwork addresses for all computers and other connected devices, as well as with the best route for transferring data between any two devices.

Because RIP is a distance-vector protocol, NetWare routers that use RIP work in the way described above, performing periodic checking and information exchange and updating their routing tables with any new information

RIP is one of a number of well-known distance-vector routing protocols. Examples of other such protocols include IP RIP and Cisco IGRP, part of the IP protocol suite, and RTMP, part of the AppleTalk protocol suite

NLSP: A Link-State Routing Protocol

The NetWare Link Services Protocol is a link-state routing protocol This type of protocol derives its name from the fact that link-state routers track the status of other routers and links

Link-state protocols, a relatively recent development, adapt more quickly to network topology changes than do distance-vector protocols. Thus, they are better than distance-vector protocols for managing internetworking on large, complex internetworks.

In an internetwork that uses a link-state routing protocol, each router or server provides information about itself and its immediate neighbors to every reachable router in a routing area Each router's map includes all the area's routers and servers, the links connecting them, and the operational status of each router and link. However, each router builds its own routing map rather than relying on secondhand summaries, as do distance-vector routers. Also, routing transmissions are made only when the internetwork changes, not at predefined intervals, regardless of whether the internetwork has changed Thus, networks using link-state routing are not burdened by unnecessary routing traffic.

Because NLSP works as explained above, it significantly reduces the communication overhead required for routing NLSP can significantly improve network performance because it frees resources to be used for transferring data packets rather than routing information. NLSP is particularly efficient for wide area network routing, where available communication bandwidth is ordinarily limited.

Examples of other link-state protocols include the Open Shortest Path First protocol, part of the TCP/IP protocol suite, and the Intermediate System-to-Intermediate System protocol, a router-to-router protocol that is part of the OSI suite

As a matter of note, various link-state and distance-vector routing protocols can coexist on the same NetWare internetwork and even in the same NetWare MultiProtocol Router. Furthermore, individual routers can be configured to accept or to reject individual protocols.

SAP: Service Advertising Protocol

The Service Advertising Protocol is similar in concept to RIP. Just as RIP enables routers to exchange routing information, SAP enables networked devices, such as network servers and routers, to exchange information about available network services.

Servers and routers use SAP to advertise their services and network addresses. SAP enables network devices to constantly correct their information about which network services are available. While servers are running, they use SAP to inform the rest of the network of the services they offer. When a server goes down, it uses SAP to inform the network that its services are no longer available

Routers gather service information and share it with other routers. Workstations use the information made available through SAP to obtain the network addresses of servers that offer the services they need

NCP: NetWare Core Protocol

The NetWare Core Protocol is a set of service protocols that a server's operating system follows to accept and respond to service requests

NCP does not play a direct role in routing. However, it does provide session control and packet-level error checking between NetWare workstations and routers

SPX: Sequenced Packet Exchange

SPX is a transport-layer protocol. Standards at this OSI layer provide for the reliability of the end-to-end communication link. Accordingly, SPX provides guaranteed packet delivery and packet sequencing.

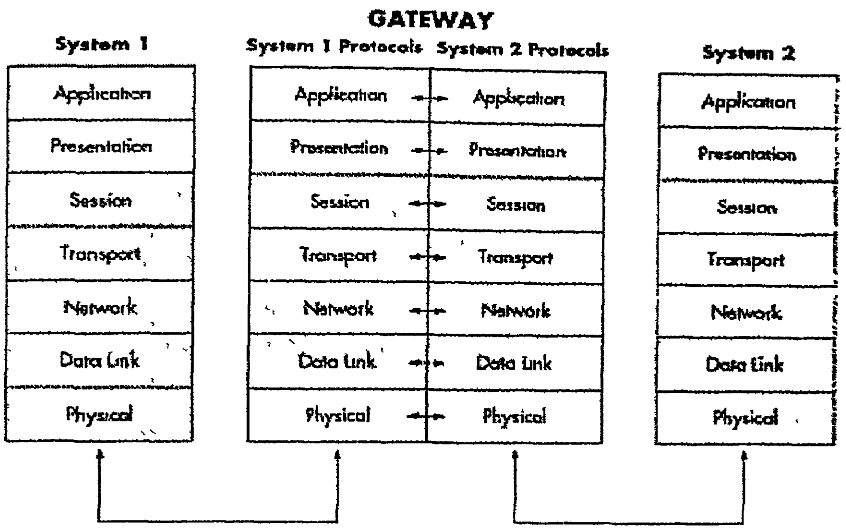
Like NCP, SPX does not play a direct role in routing. SPX is connected with internetworking only in that it guarantees delivery of all routed packets.

Gateways

In contrast to bridges and routers, which function at only one layer of the OSI model, a gateway translates protocols at more than one OSI layer Therefore, a gateway is used to interconnect computer systems that have different architectures and that therefore use different communication protocols at several OSI layers.

A gateway may connect dissimilar systems on the same network or on different networks (thus, using a gateway does not necessarily involve internetworking) For example, a gateway might translate protocols at several different OSI layers to allow transparent communications between NetWare IPX-based systems and systems based on TCP/IP, System Network Architecture (SNA), or AppleTalk. Figure 16 illustrates how a gateway is used to translate protocols to enable communications between two heterogenous systems.

Figure 16: Gateways provide protocol translation between dissimilar systems at more than one OSI layer.



A gateway may consist of hardware, software, or a combination of the two, and it may provide translation at all or at only some of the different OSI layers, depending on the types of systems it connects

There are a number of NetWare gateways that provide access to computer systems not based on the native NetWare/IPX protocol suite. NetWare for Macintosh is a software-based gateway that connects Macintosh computers to a PC-server-based NetWare network NetWare for SAA is a gateway that enables NetWare users to transparently access SNA-based IBM hosts, and NetWare for DEC Access is a gateway that enables transparent access to Digital Equipment Corporation (DEC) hosts.

Real World Networking

In the real world, computer networks can take an almost unlimited number of physical and topological forms We've already seen a very simple network Now let's take a look at more complex networks We'll start with simple internetworks and work our way gradually through more complex situations For the sake of simplicity and clarity, all of the subnetworks in our internetworks will be based on the NetWare client-server networking model

One Server, Multiple Networks of the Same Type

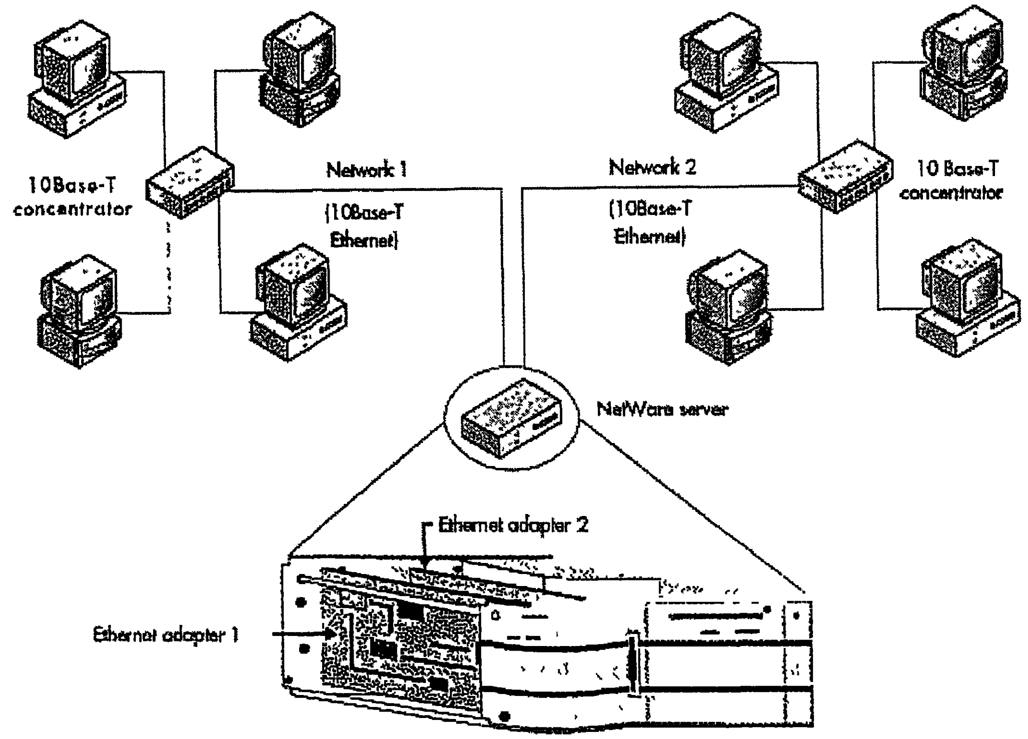
The simplest form of an internetwork is two cabling systems of the same media access control type sharing one network server.

For example, one server could contain two Ethernet network adapters, each supporting a different cabling system There could be several computers connected to each cabling system. in a star physical layout, with each cabling system using contention (CSMA/CD) for the media access control Each of the cabling systems would have a different network address--thus, each would be an independent network.

Together, the two separate networks would form an internetwork, connected by means of internal routing capabilities built into the server. (Remember, we have already said that in NetWare servers, internetworking is accomplished through routing at the network layer.)

Figure 17 illustrates the one-server internetwork described above

Figure 17: Internetworking two networks using the same type of network adapter (MAC) in one NetWare server, by means of the server's internal routers



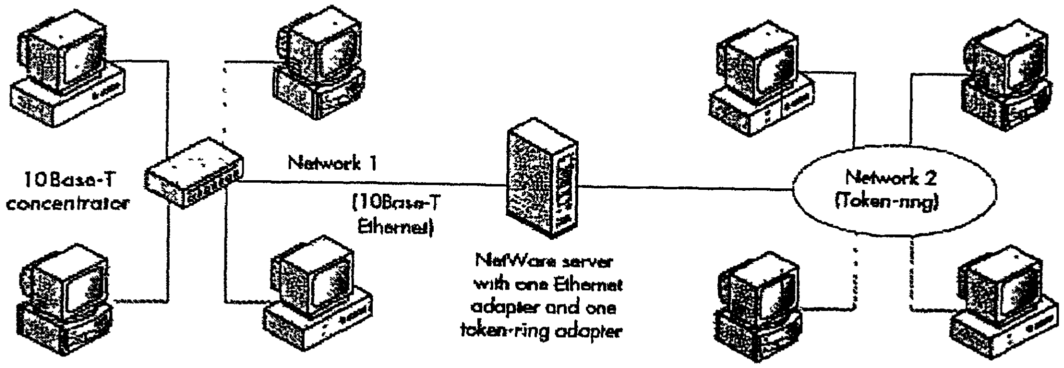
In the case of the above network, routing would be accomplished using the NetWare IPX protocol, with support from the other NetWare routing protocols, as previously described

Every NetWare server is capable of using internal routers to accomplish local network routing by means of the NetWare routing protocol set, as well as by IP and AppleTalk All NetWare internal routers operate at layer three of the OSI model and are for use with small workgroup or departmental networks. For larger or more complicated internetworks, or for departments with heavy server-processing requirements, the NetWare MultiProtocol Routers provide the necessary extra routing power and capabilities.

In a slightly more complex internetwork, a NetWare server could support cabling systems using the same physical layouts but different media access controls

For example, a server could contain one Ethernet network adapter and one token-ring network adapter, with a cabling system attached to each The Ethernet network might be connected in a physical star and use CSMA/CD for the media access control The token-ring network might also be connected in a physical star, but it would use token passing for media access control. Like the simpler configuration explained above, each cabling system would have a different network address Figure 18 illustrates this more complex one-server internetwork.

Figure 18: Internetworking two networks using different types of network adapters (MAC) in one NetWare server, by means of the server's internal routers



In the case of the internetwork shown above, routing would again be accomplished using the NetWare IPX protocol, with support from the other NetWare routing protocols.

The two one-server networks we have seen each support only two separate networks As a matter of note, all NetWare servers are capable of supporting as many as four different network adapters (four separate networks), in any combination of same or different types.

Please notice that even though the token-ring network above was described as a physical star, it is drawn as a ring to signify that it is a token-ring network (which uses token passing as the media access control) We will adhere to this convention throughout this primer because in virtually all illustrations it will be more important to make the topology clear than to be concerned with the actual physical layout.

Multiple Servers With Multiple Networks of Different Types

In an even more complex internetwork, there may be multiple servers.

For example, a complex internetwork might consist of two one-server internetworks connected by a standalone router, such as the NetWare MultiProtocol Router, to form a larger two-server internetwork. Each server might contain multiple network interface adapters

One server might contain two Ethernet network adapters and one token-ring network adapter, with a cabling system attached to each. One of the Ethernet adapters might support a PC network, and the other Ethernet adapter might connect to both PCs and Macintosh computers The NetWare for Macintosh product running on the server would support the Macintosh computers

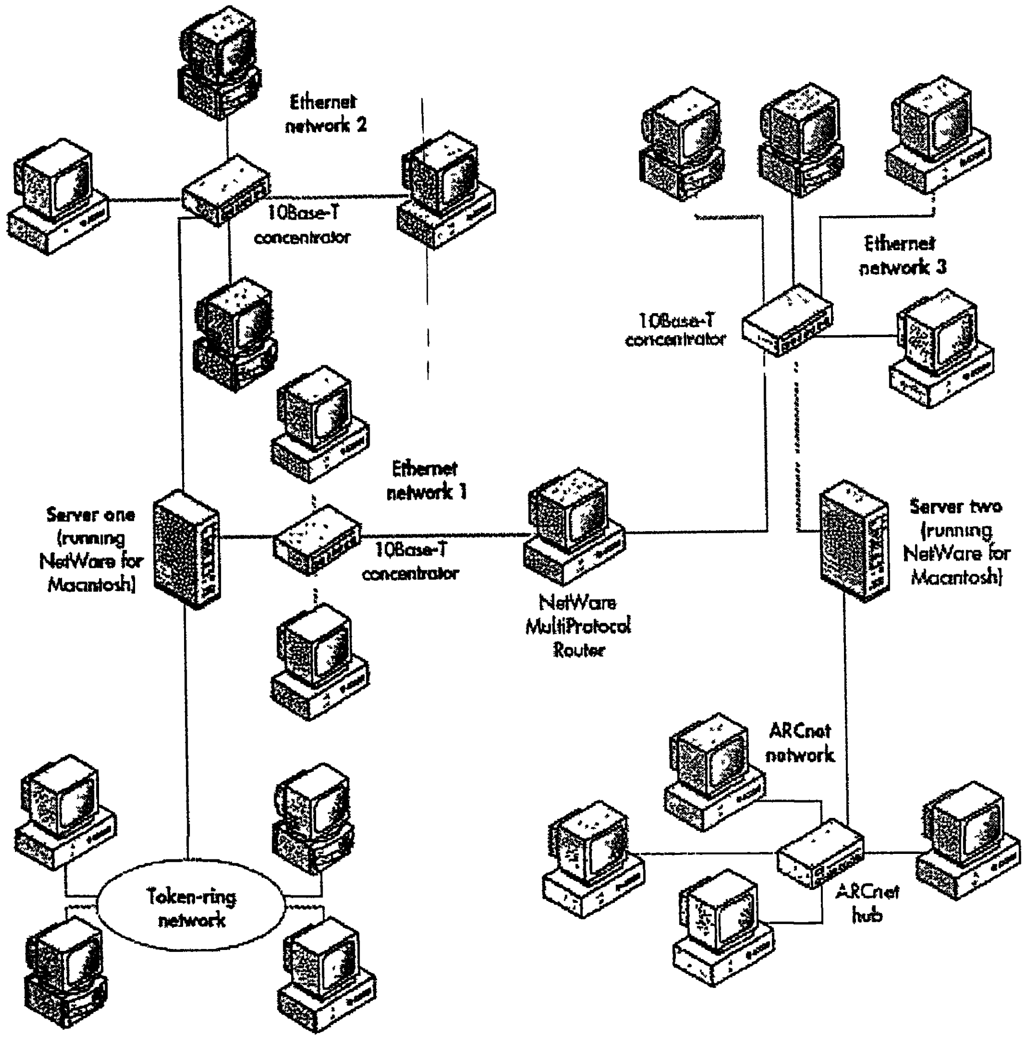
The other server might contain one Ethernet adapter and one ARCnet adapter, with the Ethernet adapter again supporting both PCs and Macintoshes, and the ARCnet adapter supporting a cabling system with a number of PCs attached.

Each of the two servers would have a unique internal network number (address), and each cabling system in each server would have a unique physical network address

In this case, there would be five subnetworks on the internetwork, three attached to one server and two attached to the other The internal server routers would accomplish the routing between any two workstations on networks attached directly to the same server. The intermediate standalone router would accomplish the routing between any two workstations on networks attached to different servers

Figure 19 illustrates the two-server internetwork described above.

Figure 19: Internetworking multiple networks using different types of network adapters (MAC) in two NetWare servers, by means of internal and standalone routers



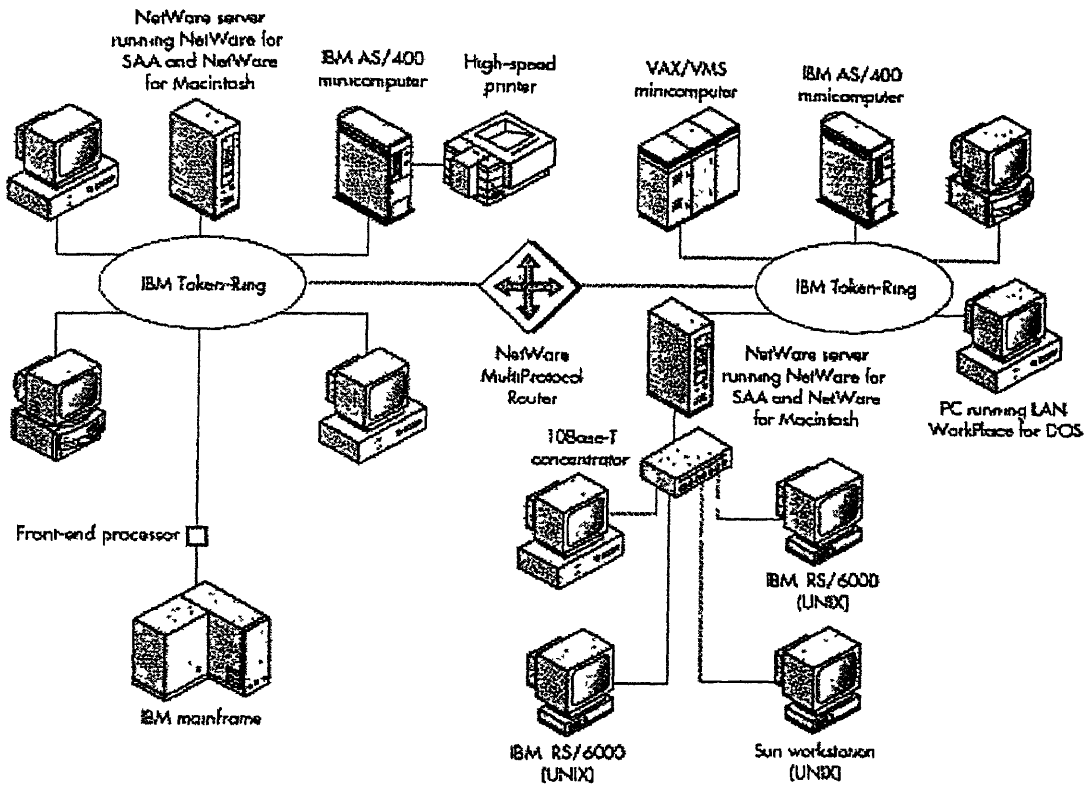
Host Access

An already complex multiserver internetwork becomes even more complex with the addition of connections to host computer systems, including mainframe computers such as IBM mainframes, to minicomputers such as IBM's AS/400 or a DEC VAX system, or to other hosts such as UNIX workstations

Host systems can provide access to additional application software, additional resources such as data storage devices and printers, and additional processing power. For example, you might want to log in to an IBM AS/400 minicomputer to run an application available only on that computer or to use its processing power for one task while you were using the processing power of your own workstation for some other task Or, you might want to print a large report on a high-speed printer connected to the AS/400

The illustration in Figure 20 shows a multiserver NetWare network with an IBM mainframe, an IBM AS/400 minicomputer, and several UNIX workstations connected as host computers.

Figure 20: Host systems connected to a complex multiserver NetWare network



A number of leading networking companies have entered into original equipment manufacturer (OEM) partnerships with Novell Many provide NetWare connectivity to host-based environments

Wide Area Networking

So far, we have looked only at internetworks existing at one local site, with computers and other devices directly connected by some type of cabling. This type of network is commonly referred to as a "local area network" (LAN) Now let's add another level of complexity to the internetworking picture Let's connect complex multiserver internetworks that exist at separate sites, which might be any number of miles apart. Connecting computer networks in these circumstances is called "wide area networking "

The traditional definition of wide area networking has been "connecting two or more networks existing at widely separate geographic sites " Some traditionalists also prescribe that the separate networks must be connected by means of common carrier telecommunication facilities (private companies that rent resources such as T1 lines and microwave transmission equipment) For the purposes of this primer, we'll use the first, most general definition and let you decide how to apply it in specific internetworking cases. But, to give you some background to help you make such decisions, let's discuss a few specific internetworking cases and a few terms related to wide area networking.

Of course, like any general term used in connection with rapidly changing technology, not everyone will agree on an exact definition of wide area networking What is "widely separate"? And, does the connection really have to be through a common carrier? Many major companies now own their own equipment linking networks many miles apart.

Let's look at some examples. Suppose you connect two networks in two different buildings 100 yards apart by means of asynchronous modems and common telephone lines. Is that wide area networking? Most knowledgeable computer networking people would say no--this would be "one-site" or "campus" networking What if the networks were two miles apart and separated by a major interstate highway? Or, what if they were 15 miles apart, on opposite sides of a major city? There are many computer networking people who would still not call this wide area networking, they might use a recently coined term--"metropolitan area networking." Others consider metropolitan area networking a part of wide area networking Of course, almost everyone agrees that two networks connected on opposite sides of a continent by means of a satellite microwave link rented from a common carrier is an example of a wide area network

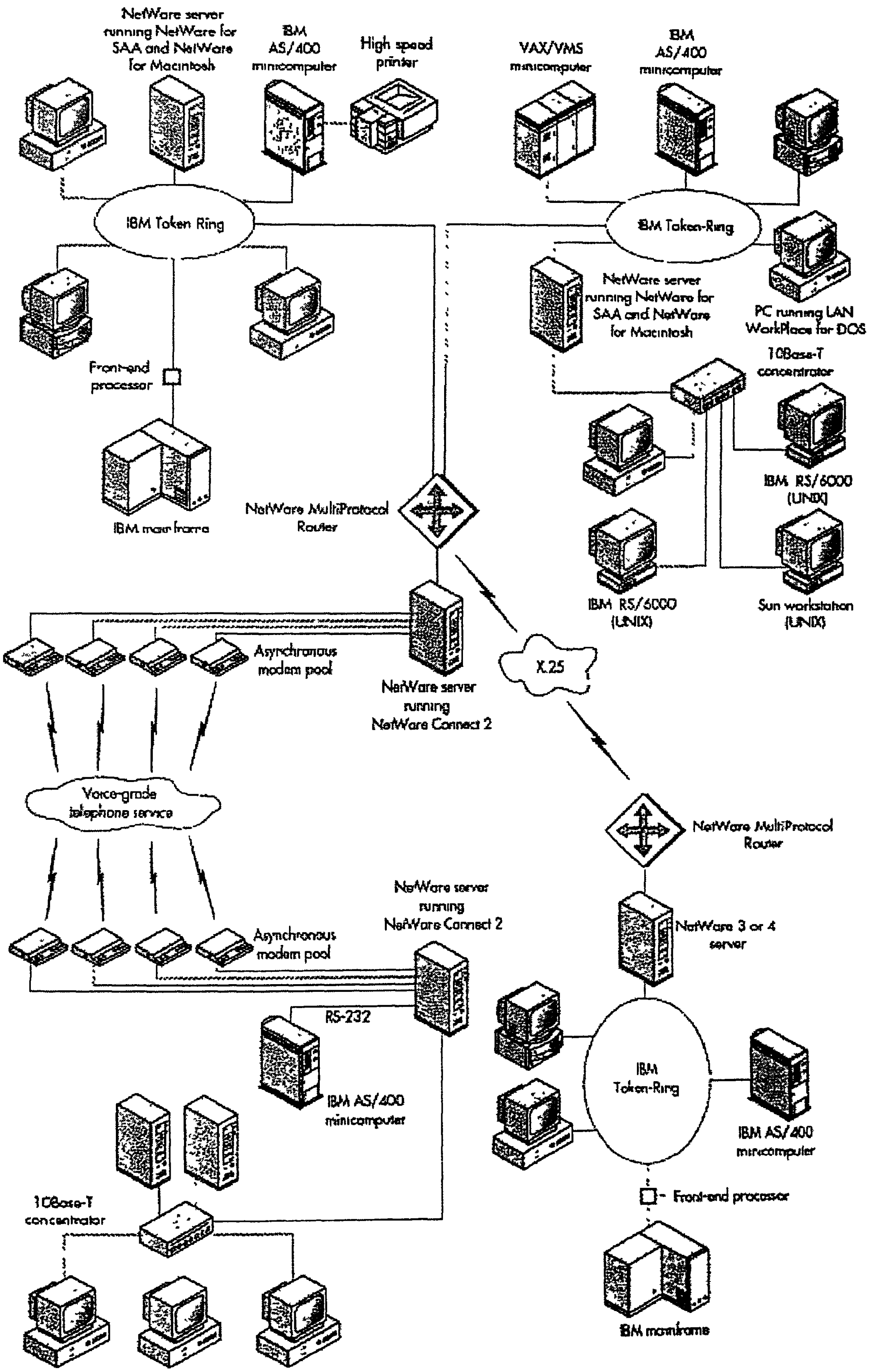
You can decide for yourself where you think wide area networking begins and ends. Now let's look at some general possibilities

Figure 21 shows two separate branch office internetworks connected to a third internetwork at a main corporate office Each of the three existing internetworks has multiple servers and existing host connections. One of the branch office networks is connected to the corporate network by means of asynchronous modems and regular voice-grade telephone lines. The other branch office network is connected by means of a common carrier-provided intermediate link--in this case an X 25 packet-switching network Examples of such networks include Tymnet or Telenet

However, either network could be connected by other means that we have discussed, such as a microwave link or leased lines, perhaps using PPP

The following section describes important WAN and LAN technologies in greater detail

Figure 21: Wide area networking: three networks at widely separated sites connected through asynchronous modems and an X.25 connection


NetWare server running NetWare for SAA and NetWare for Macintosh
IBM AS/400 minicomputer
High speed printer
VAX/VMS minicomputer
IBM AS/400 minicomputer
IBM Token Ring
IBM Token-Ring
NetWare server running NetWare for SAA and NetWare for Macintosh
PC running LAN WorkPlace for DOS
10Base-T concentrator
Front-end processor
IBM RS/6000 (UNIX)
IBM mainframe
NetWare MultiProtocol Router
IBM RS/6000 (UNIX)
Sun workstation (UNIX)
Asynchronous modem pool
X.25
NetWare server running NetWare Connect 2
Voice-grade telephone service
NetWare MultiProtocol Router
NetWare server running NetWare Connect 2
NetWare 3 or 4 server
Asynchronous modem pool
RS-232
IBM AS/400 minicomputer
IBM Token-Ring
IBM AS/400 minicomputer
10Base-T concentrator
Front-end processor
IBM mainframe

Important High-Speed and WAN Technologies

These days, if you pick up any computer networking magazine, you'll find that among the hot topics are the technologies that make networks faster and connect geographically distant networks--technologies such as frame relay, 100VG-AnyLAN, and ATM. We mentioned these and other high-speed and WAN technologies under the "Commonly Used Standards" heading of this primer. Brief explanations will help you more fully understand what these technologies are and why they are important The following technologies will be treated:

- 100Base-T
- 100VG-AnyLAN
- Fiber Distributed Data Interface (FDDI)
- X.25
- Frame relay
- Asynchronous Transfer Mode (ATM)
- Integrated Services Digital Network (ISDN)
- Synchronous Optical Network (SONET)

100Base-T

100Base-T is a high-speed LAN technology 100Base-T is officially designated as the IEEE 802 3u standard. It functions at the data-link (OSI level two) layer's medium access control sublayer and provides data transfer rates as high as 100 megabits per second (Mbit/s)

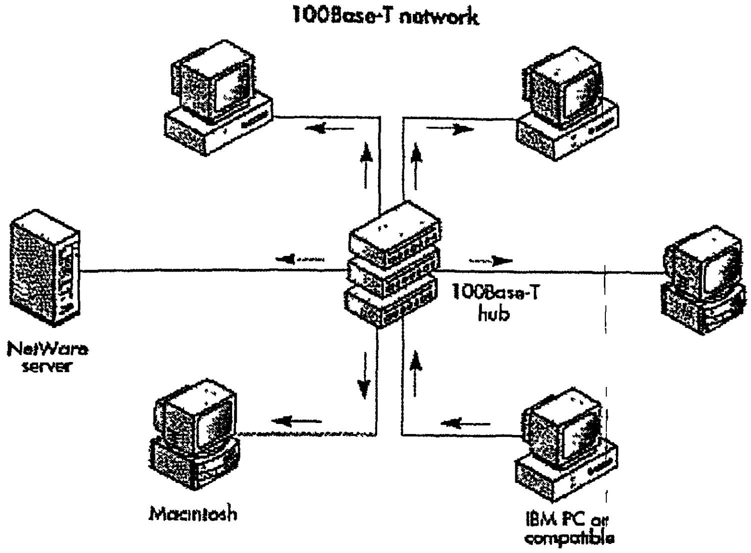
Distinguishing Characteristics

Like 10Base-T Ethernet, 100Base-T uses carrier sense multiple access with collision detection as the medium access control method. (CSMA/CD was discussed earlier under the "Bus Topology" heading of this primer) 100Base-T is based on the scalability of CSMA/CD Scalability is the ability of something to be made larger or smaller. It usually implies a minimum effort to accommodate growth or reduction

CSMA/CD was known to be scalable before the 100Base-T standard was created. A scaled-down version of Ethernet (1Base-5) uses CSMA/CD, provides data transfer rates of 1 Mbit/s, and enables longer transmission distances between repeaters. If CSMA/CD could be scaled down, then it could be scaled up Specifying changes such as decreased transmission distances between repeaters produced a reliable data transfer rate for 100Base-T Ethernet of 100 Mbit/s, 10 times faster than traditional 10Base-T Ethernet

100Base-T supports Category 3 and 5 unshielded twisted-pair (UTP) wiring, Type-1 shielded twisted-pair (STP) wiring, and fiber-optic cable It uses four wire pairs of Category 3 UTP cable--three for data and one for collision detection However, 100Base-T uses only two wire pairs of Category 5 UTP cable

Figure 22: On 100Base-T networks, the physical topology is a star and the logical topology is a bus. A broadcast signal travels to all parts of cable.



Advantages

100Base-T is widely available. Adapter cards and cable to install or upgrade to 100Base-T are currently available from various vendors.

In addition, it's easy to upgrade from 10Base-T Ethernet to 100Base-T Ethernet Both traditional 10Base-T and 100Base-T Ethernet use CSMA/CD, and some network cards now support both 10 Mbit/s and 100 Mbit/s Ethernet. The adapter cards automatically sense whether it is a 10 Mbit/s or 100 Mbit/s environment and adjust accordingly Therefore, 100Base-T and traditional 10Base-T Ethernet can exist on the same network, enabling network supervisors to upgrade at their own pace. Also, CSMA/CD is already familiar to many network supervisors, minimizing the need for retraining

Moreover, 100Base-T can be an inexpensive way to make your network faster Network adapter cards for 100Base-T are only about twice the price of 10Base-T Ethernet cards In addition, Category 3 and Category 5 UTP cable are relatively inexpensive and many organizations already have either Category 3 or 5 cable installed.

Disadvantages

100Base-T will reduce the maximum network size compared to 10Base-T because the standard specifies shorter transmission distances between repeaters

In addition, the fact that 100Base-T is based on CSMA/CD creates problems 100Base-T may scale CSMA/CD to its limit, making 100 Mbit/s the maximum data transfer rate for this standard. To increase data transfer rates, 100Base-T specifies shorter distances between signal repeaters, but these distances may be as short as is practical Also, because CSMA/CD is a contention scheme, collisions will occur, especially under maximum loads, reducing network throughput

Furthermore, 100Base-T requires four wire pairs of Category 3 cable, but not all companies have four wire pairs available Thus, companies that are already using some wire pairs for a different purpose, or that installed cable with less than four wire pairs or that does not meet Category 3 standards, will have to recable to use 100Base-T.

100VG-AnyLAN

100VG-AnyLAN, which is officially designated as the IEEE 802 12 standard, is a high-speed LAN technology that competes with 100Base-T Like 100Base-T, 100VG-AnyLAN functions at the data-link layer (OSI level two) and provides data transfer rates as high as 100 Mbit/s. However, 100VG-AnyLAN differs from 100Base-T in several important respects.

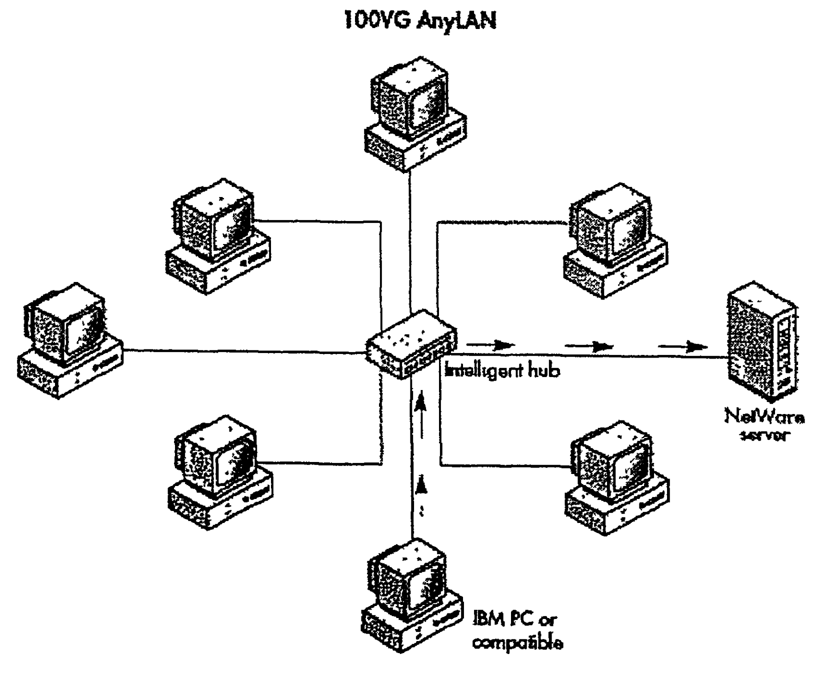
Distinguishing Characteristics

Instead of using CSMA/CD as the medium access control method, 100VG-AnyLAN uses a method called demand priority Demand priority is not a contention scheme; rather, it uses a form of token passing that assigns the token (permission to broadcast data packets) based on a priority scheme that the network supervisor establishes for different types of LAN traffic and on the order in which an intelligent hub receives requests

For example, when a workstation needs to transmit, it signals the intelligent hub that it needs access to the transmission media If the intelligent hub receives several requests, it will give access to the workstation that has the highest priority. (100VG-AnyLAN will also function without a prioritization scheme) If the workstations requesting access have the same priority, the intelligent hub will assign the token to the workstations in the order they request access to the transmission media.

In addition, 100VG-AnyLAN supports both Ethernet and token-ring networks. It also supports Category 3 and 5 UTP, Type-1 STP, and fiber-optic cable. 100VG-AnyLAN uses four wire pairs of Category 3 or Category 5 UTP cable

Figure 23: On 100VG-AnyLAN networks, both the physical and logical topologies are stars. The signal from one node goes to the intelligent hub and is routed only to the correct destination node.



Advantages

Because 100VG-AnyLAN uses demand priority, it has several advantages over 100Base-T First, 100VG-AnyLAN provides the necessary bandwidth and timing (low latency) needed by applications such as multimedia applications Network supervisors can, if desired, assign higher priority to the hub ports used to connect workstations or servers that frequently transmit time-sensitive data, such as audio and video. Second, the demand priority media access method avoids the collisions that can occur on 100Base-T networks Third, 100VG-AnyLAN networks do not broadcast packets to all workstations, which makes 100VG-AnyLAN networks more secure against eavesdroppers than 100Base-T networks

Furthermore, unlike 100Base-T, 100VG-AnyLAN supports token-ring networks as well as Ethernet, providing data transfer rates as high as 100 Mbit/s to the former

100VG-AnyLAN and 100Base-T also share many advantages The cost of 100VG-AnyLAN is comparable to 100Base-T Adapter cards that support both 10 and 100 Mbit/s are about twice the price of traditional 10Base-T Ethernet cards. Both standards also support the same types of transmission media. In addition, both offer an easy upgrade

Disadvantages

Unlike 100Base-T's CSMA/CD, which is familiar to many network supervisors, demand priority is new, and network supervisors will require some training to use it effectively Also, 100VG-AnyLAN has a smaller market share than 100Base-T. Consequently, it is not supported by as many vendors, which means that fewer products are available for 100VG-AnyLAN

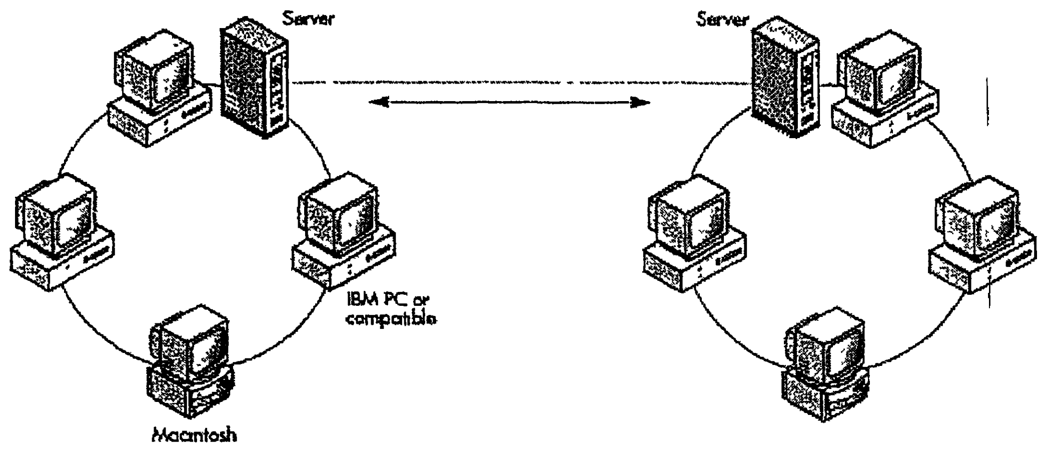
Previously installed cable may be problematic for 100VG-AnyLAN networks, as it is for 100Base-T 100VG-AnyLAN uses all four wire pairs of Category 3 or 5 UTP cable. Thus, companies that are already using some wire pairs for a different purpose, or that installed cable with less than four wire pairs or that does not meet Category 3 standards, will have to recable to use 100VG-AnyLAN

Fiber Distributed Data Interface

Fiber Distributed Data Interface is also a high-speed LAN technology It is not generally used for direct connection to desktop computers, but rather as a backbone technology A backbone connects two or more LAN segments to provide a path for transmitting packets among them A simple backbone might connect two servers through a high-speed link consisting of network adapter cards and cable

FDDI is officially designated as ANSI X3T9 5 and operates at the physical and data-link layers (levels one and two) of the OSI model Like 100Base-T and 100VG-AnyLAN, FDDI provides data transfer rates as high as 100 Mbit/s

Figure 24: A simple server-based backbone connecting two LAN segments



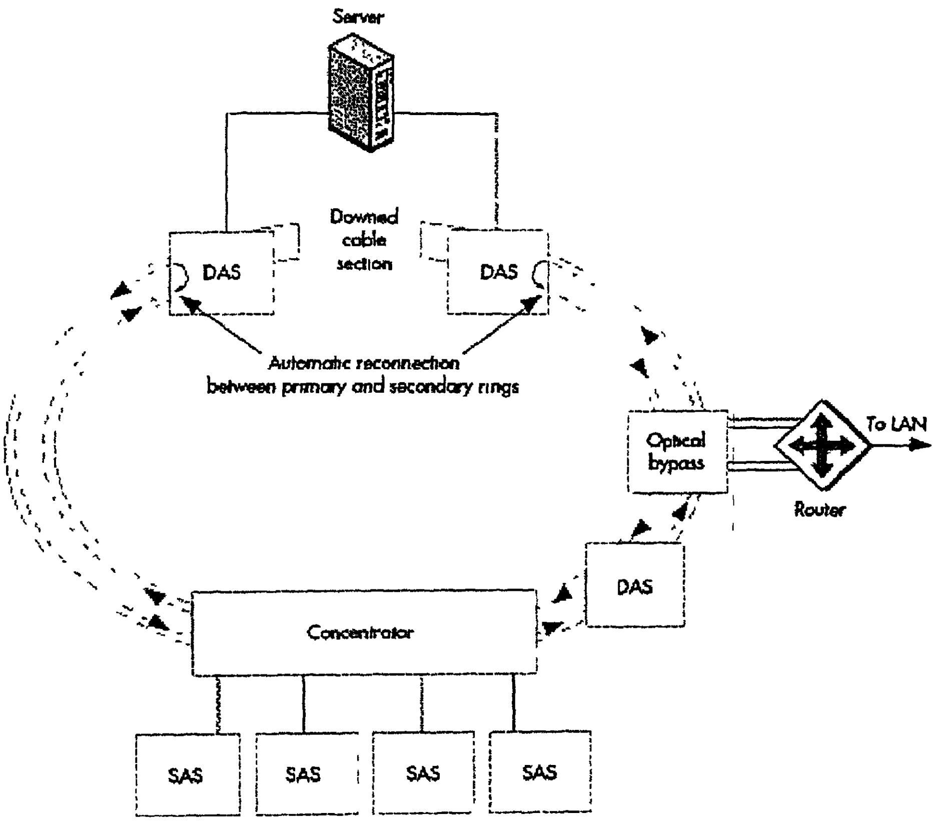
Distinguishing Characteristics

FDDI networks have a dual, counter-rotating ring topology This topology consists of two logical closed signal paths called rings. Signals on the rings travel in opposite directions from each other Although both rings can carry data, the primary ring usually carries data while the secondary ring serves as a backup

On FDDI networks, every node acts as a repeater FDDI supports four kinds of nodes. dual-attached stations (DASs), single-attached stations (SASs), single-attached concentrators (SACs), and dual-attached concentrators (DACs) DASs and DACs attach to both rings; SASs and SACs attach only to the primary ring Several SASs often attach to the primary ring through a concentrator so that an SAS failure will not bring down the entire network If the cable is cut or a link between nodes fails, DASs or DACs on either side of the failure route signals around the failed segment using the secondary ring to keep the network functioning

FDDI uses token passing for the medium access control method and is implemented using fiber-optic cable

Figure 25: If a cable section on an FDDI network goes down, DASs on either side of the failed section automatically reconnect the primary and secondary rings. Also note that the server has a redundant connection to improve reliability.



Advantages

FDDI is a fast, reliable standard The dual, counter-rotating ring topology increases the network's reliability by keeping the network functioning even if a cable is damaged FDDI also offers network management support, which was designed directly into the standard Also, the standard includes a specification for UTP cable called Copper Distributed Data Interface (CDDI), which is less expensive than fiber-optic cable

Disadvantages

FDDI's main disadvantage is price. FDDI adapter cards and fiber-optic cable are both relatively expensive compared to other technologies offering the same speed Fiber-optic cable installation also requires more expert technicians Even CDDI adapters, which are less expensive than FDDI adapters, are more expensive than either 100Base-T or 100VG-AnyLAN adapters

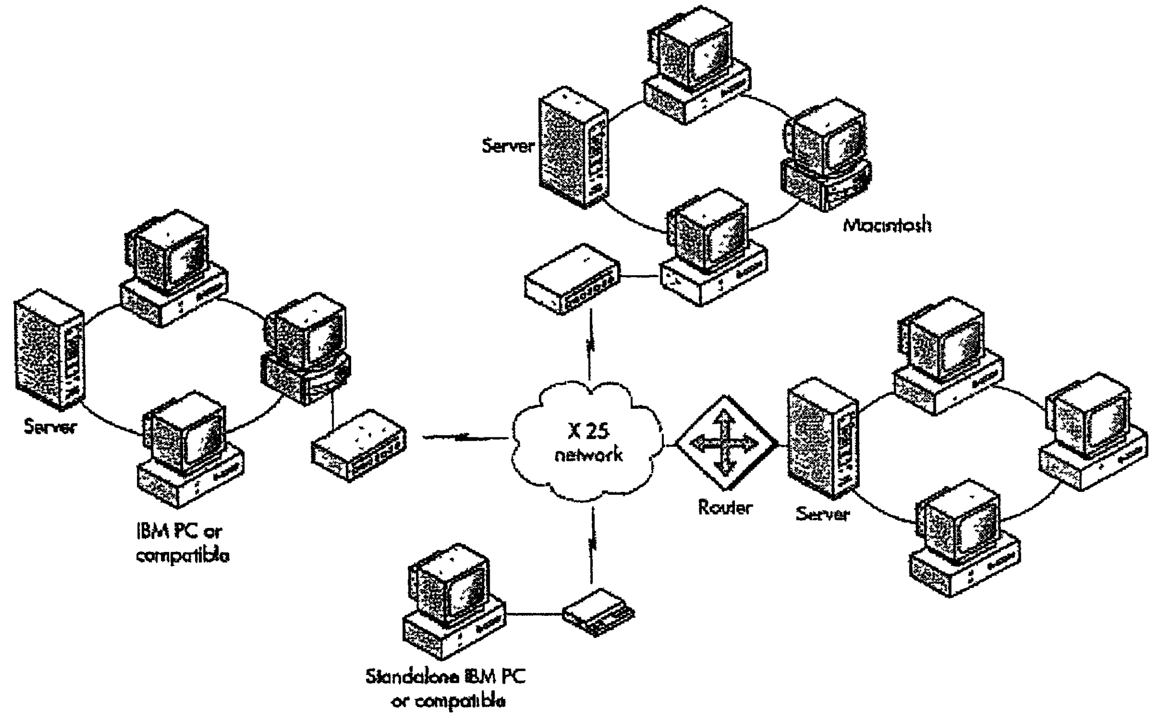
X.25

X 25 is a commonly used WAN standard at the network layer (level three) of the OSI model. It is a CCITT (now known as the International Telecommunications Union (ITU)) standard and includes data-link and physical layer protocols (LAP-B and X 21), as shown in Figure 11 X.25 provides data transfer rates of 9 6 kilobits per second (Kbits/s) to 256 Kbits/s, depending on the connection method

Distinguishing Characteristics

X.25 specifies the interface for connecting computers on different networks by means of an intermediate connection through a packet-switched network (for example, CompuServe, Tymnet, or Telnet) X 25 was defined when the quality of transmission media was relatively poor As a result, the standard specifies that each node in the packet-switched network must fully receive each packet and check it for errors before forwarding it.

Figure 26: X.25 networks are often provided by telecommunications carriers. CompuServe uses X.25 on its network.



Advantages

X 25 is well understood and reliable Connections to X 25 networks can be made through the existing telephone system, ISDN, and leased lines Because access is so simple, it is comparatively inexpensive X 25 is also available worldwide In countries with little or no digital telecommunications infrastructure, X 25 may be the best WAN technology available

Disadvantages

Although it is widely available, X 25 is slow compared to newer technologies The process of checking each packet for errors at each node limits data transfer rates It also uses variable-size packets, which can cause transmission delays at intermediate nodes In addition, many people connect to X 25 networks through modems, which limit data transfer rates to 9 6 Kbit/s to 28.8 Kbit/s Although X 25 is likely to remain in use for some time, newer, faster standards are already replacing it.

Frame Relay

Frame relay, like X 25, is a WAN technology Approved by ANSI and the ITU, frame relay works at the data-link layer (level two) of the OSI model, providing data transfer rates from 56 Kbits/s to 1 544 Mbits/s

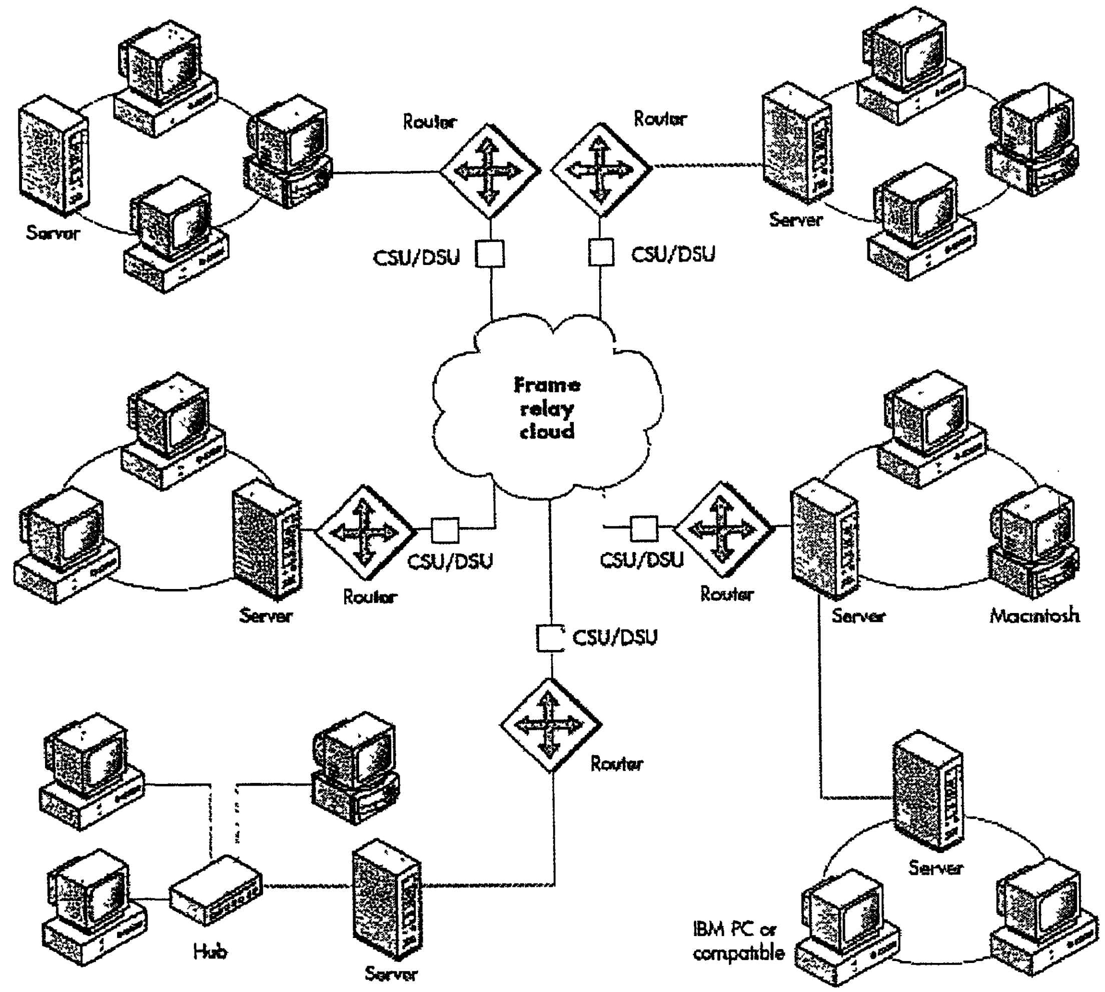
Distinguishing Characteristics

Frame relay is an interface specification for connecting LANs over public packet-switched networks. This standard can be thought of as a simplified version of X.25 designed to take advantage of digital transmission media

Frame relay services are typically provided by telecommunications carriers. Customers install a router and lease a line (often a T1 or fractional T1 line) to provide a permanent connection from the customer's site to the telecommunications carrier's network. This connection enables frame relay to use permanent virtual circuits (PVCs), which are predefined network paths between two locations

With frame relay, the router encapsulates (or frames) network layer packets, such as IP and IPX packets, directly into a data-link level protocol and sends them on to the packet-switched network Like X.25, frame relay uses variable-size frames, but it eliminates the error checking required on X 25 networks. A frame relay switch simply reads the header and forwards the packet, perhaps without even fully receiving a frame before forwarding it Intelligent end stations must identify missing or corrupted frames and request retransmission

Figure 27: Frame relay is a WAN technology that enables companies to connect LANs through a telecommunications carrier's network. AT&T WorldNet Intranet Connect Service currently uses this technology



Advantages

Frame relay offers several advantages over X 25 Most importantly, frame relay is faster than X 25 Frame relay uses PVCs over leased lines rather than a modem connection Unlike modem connections, PVCs transmit and receive data immediately, eliminating the call setup and handshaking that modems must perform In addition, as mentioned above, frame relay does not require error checking and flow control at the switches, reducing overhead and leaving more bandwidth for data transmission Also, although not as prevalent as X 25, frame relay is a common standard in many countries Finally, frame relay is less expensive than other WAN technologies because it provides bandwidth on demand, rather than dedicating bandwidth whether data is being transmitted or not.

Disadvantages

Although frame relay is faster than X.25, its speed is limited because it uses variable-size frames, which can cause delays at switches along the frame's path As a result, frame relay cannot support applications that require low latency, such as real-time video

In addition, frame relay is more complex to implement than X.25 Customers must negotiate a service agreement with the phone company, lease a line, and have it installed. They must also purchase and install a frame relay-compatible router Value-added resellers and some telephone companies will assist customers in determining their needs and will help install the technology

Asynchronous Transfer Mode

Asynchronous Transfer Mode is both a LAN and a WAN technology. It is generally implemented as a backbone technology In the OSI model, ATM works at the data-link layer (level two)

ATM is extremely scalable, data transfer rates range from 25 Mbit/s to 2 4 gigabits per second (Gbit/s) This wide range of data transfer rates reflects the various ways in which ATM can be used The 25 Mbit/s rate is a new offering meant for desktop environments In LAN backbones, ATM provides data transfer rates of 100 Mbit/s and 155 Mbit/s At the high end, WAN implementations using ATM and SONET together have achieved data transfer rates of 2.4 Gbit/s (To learn more about SONET, see the "Synchronous Optical Network" section in this primer)

Distinguishing Characteristics

ATM is a cell relay technology, meaning that it uses standard-sized packets called cells. The size of an ATM cell is 53 bytes

In a LAN implementation, ATM functions at the data-link layer's medium access control sublayer It further divides the MAC sublayer into three layers· LAN Emulation, ATM Adaptation Layer (AAL), and ATM. LAN Emulation enables you to integrate ATM with Ethernet and token-ring networks without modifying existing Ethernet or token-ring protocols

On a mixed network, LAN Emulation hardware sits between the Ethernet or token-ring segment and the ATM part of the network It uses the three layers mentioned above to convert packets moving toward the ATM segment into cells and to assemble cells moving toward the Ethernet or token-ring segment into packets. AAL and ATM put data into standard-sized cells In most network computing situations, ATM Adaptation Layer 5 breaks packets into 48-byte blocks that are then passed to the ATM layer, where the five-byte header is attached to form a complete 53-byte cell

Advantages

Many people believe that ATM will become the industry-standard transmission technology for LANs and WANs The scalability, discussed above, seems to be limitless Data transfer rates have climbed into the gigabit range and are still growing

One reason that ATM is so fast is its use of cells Because cells are a standard size, ATM networks handle data in a predictable, efficient manner at the switches Standard-sized cells and high-bandwidth media like fiber-optic cable also enable ATM to support real-time voice, video, and data traffic

ATM also offers flexibility in its transmission media As many as 22 ATM specifications exist for media like unshielded twisted-pair, shielded twisted-pair, and fiber-optic cable. (ATM is generally implemented with fiber-optic cable)

Although it is seen as a technology of the future, ATM can presently work with Ethernet and token-ring networks using LAN Emulation

Disadvantages

ATM standards are still developing Without industry standards, interoperability between equipment from different vendors is not guaranteed. Furthermore, ATM is more expensive than the other high-speed LAN technologies The expense is preventing many companies from taking ATM to the desktop.

Integrated Services Digital Network

Integrated Services Digital Network is a set of protocols defined by CCITT to integrate data, voice, and video signals into digital telephone lines. It functions at the physical, data-link, network, and transport layers (levels one through four) of the OSI model. ISDN offers data transfer rates between 128 Kbit/s and either 1 544 Mbit/s or 2 048 Mbit/s, depending on what country you live in

Distinguishing Characteristics

ISDN makes end-to-end digital connections over telephone lines Although many telephone networks are almost completely digital, the local loop that connects a home or office to the telephone company's network is not Most local loops send analog rather than digital signals. ISDN replaces local analog signaling with end-to-end digital, enabling digital communications

ISDN offers Basic Rate Interface (BRI) for individuals or small branch offices and Primary Rate Interface (PRI) for larger companies BRI uses two bearer, or B, channels (providing 64 Kbit/s each) to transmit and receive data and one delta, or D, channel for call setup and management.

PRI is also called a T1 line A T1 line in the United States consists of 23 B channels and one D channel, providing a total data transfer rate of 1 544 Mbit/s A T1 line in Europe consists of 30 B channels and one D channel, providing a total data transfer rate of 2 048 Mbit/s A fractional T1 uses only some of the B channels in a T1 line (and thus offers some fraction of the total T1 data transfer rate)

ISDN requires special equipment at the customer's site, including a digital phone line and a network termination unit (NT-1). An NT-1 converts the bandwidth coming over the line into the B and D channels and helps the phone company with diagnostic testing The NT-1 also provides a connection for terminal equipment, such as ISDN telephones and computers that have an ISDN interface In addition, the NT-1 provides terminal adapter (TA) equipment to connect equipment that is not compatible with ISDN TA equipment has an ISDN interface on one side and a non-ISDN interface on the other

Advantages

ISDN increases speed and broadens data transmission capabilities, especially for those currently using analog modems to remotely connect to an office or to access the Internet It offers faster call setup and faster data transfer rates, which enable ISDN to transmit voice, data, limited video, fax, and images. ISDN can also be used for limited LAN-to-LAN communications

ISDN offers the flexibility to transmit voice and data traffic simultaneously. An ISDN user could download information and talk on the phone at the same time For example, one configuration enables BRI ISDN users to use the two B channels (128 Kbit/s) for data and part of the D channel for a phone conversation.

Disadvantages

Although widely available in Australia, Japan, and Western Europe, ISDN is available in only 50 percent of the United States. Presently, telephone companies are working to make it available throughout the United States

Acceptance of ISDN in the United States has been slow for several reasons First, to understand ISDN well enough to even order services requires considerable effort Furthermore, configuration can be difficult. In addition, ISDN lacks the standards that ensure interoperability As a result, customers must be careful to purchase equipment that is compatible with the local phone company's equipment Another problem is that not all phone companies offer the same services, so customers must ensure that the services they need are available in their area Finally, to take full advantage of ISDN, customers must communicate with others who also have ISDN

Synchronous Optical Network

Synchronous Optical Network, also known in some countries as Synchronous Digital Hierarchy, is a WAN technology that functions at the physical layer (level one) of the OSI model. Telecommunications companies are implementing SONET on some of their networks A typical business would not implement this standard on its network SONET has been accepted by ANSI and recommended by the ITU. It specifies a number of data transfer rates from 51 8 Mbit/s to 2 48 Gbit/s

Distinguishing Characteristics

SONET defines a fiber-optic standard for high-speed digital traffic that provides the flexibility to transport many digital signals with different capacities Data communications sometimes prove difficult because digital signaling rates can vary For example, in the United States, a T1 line provides 1 544 Mbit/s, in Europe, a T1 line (sometimes called an E1 line) provides 2 048 Mbit/s SONET resolves these problems by defining how switches and multiplexers coordinate communications over lines with different speeds, including defining data transfer rates and frame format

SONET defines a number of Optical Carrier (OC) levels. Each level defines an optical signal and a corresponding electrical signal called Synchronous Transport Signal (STS) The base level is OC-1/STS-1 or 51 84 Mbit/s. Each level's rate is a multiple of 51 84 Mbit/s The table below shows the OC levels and the corresponding data transfer rates that SONET defines

OC Level: Data Rate

OC-1: 51 8 Mbit/s
OC-3: 155 5 Mbit/s
OC-4: 466.5 Mbit/s
OC-12: 622.0 Mbit/s

OC-18. 933.1 Mbit/s
OC-24 1 24 Gbit/s
OC-36. 1 86 Gbit/s
OC-48 2.48 Gbit/s

SONET also provides easy access for low-speed signals, such as DS-0 (64 Kbit/s) and DS-1 (1 544 Mbit/s) by assigning them to sub-STS-1 signals called Virtual Tributaries

Advantages

The SONET standard defines data transfer rates and a frame format that all vendors and telephone companies throughout the world can use, creating the potential for global networking SONET also includes management capabilities for telephone company equipment. Cell relay technologies such as Switched Multimegabit Data Services and ATM operate above SONET, making SONET the foundation for future broadband service

Disadvantages

Some telephone companies are currently using SONET in their networks, but they are not yet offering it to the public on a tariffed basis Unless your company is a large corporation in a metropolitan area, you probably cannot get dedicated SONET service Also, some countries do not yet have a digital, fiber-optic telecommunications infrastructure, which means they cannot take advantage of SONET

Global Networking

To conclude this networking primer, we will go beyond LANS and WANs and briefly discuss the exciting possibilities that global networking offers Two terms that describe global networking are the Internet and the Information Superhighway The Internet is the main component of global networking today; the Information Superhighway is a concept of what global networking could one day become--the global networking ideal.

The global networking ideal is the simple, powerful idea of people around the world connecting to a network on which they can share ideas, exchange information, and access endless electronic resources. Novell will play a major role in actualizing the global networking ideal Novell has the technologies, partnerships, and strategies necessary to complete its mission of enabling a billion nodes on a smart global network The fulfillment of Novell's mission is still some years away, but a simpler form of global networking, the Internet, exists today

Internet

The Internet is the world's largest computer network Literally thousands of networks from organizations such as government agencies, universities, hospitals, private businesses, and others in countries around the world are attached to the Internet Millions of users send and receive E-mail, download and upload files, do research, and conduct business on the Internet daily The Internet is a global network, but in many ways, it does not meet the global networking ideal.

From a business standpoint, for example, the Internet has several disadvantages First, the Internet uses packet-switching, so you can never be sure what route the packet will take or how long it will take to arrive Second, because no one owns the Internet, no one is responsible for ensuring that it is functioning properly. Third, while improvements have been made, security on the Internet is still a problem Fourth, the Internet does not offer the fastest data transfer rates available

Information Superhighway

The terms "Internet" and "Information Superhighway" are sometimes used synonymously, but they are not the same Information Superhighway describes the global networking ideal The ideal global network will include the Internet and other networks, services, and technologies It will provide homes, offices, and other organizations with a myriad of services, such as on-demand video, E-mail, electronic commerce, shopping, research, video-conferencing, and voting services In sum, the Information Superhighway will provide almost every digitally deliverable service to every person connected to the network

Presently, the Information Superhighway is only a concept, but governments, businesses, and public institutions are taking steps to make the Information Superhighway a reality Novell contributes to the growth of the Information Superhighway with offerings like Novell Connect Services and its family of smart network services.

We hope this primer has been helpful to you, and we welcome your comments and suggestions Happy networking!

Primer Appendix

The table below illustrates the ASCII code set. The second table, ASCII Code-to-Character Conversion, gives the code to character mapping

ASCII Code Set

Bit Settings			7	0	0	0	0	1	1	1	1
			6	0	0	1	1	0	0	1	1
			5	0	1	0	1	0	1	0	1
4	3	2	1	Resulting Codes							
0	0	0	0	0	16	32	48	64	80	96	112
0	0	0	1	1	17	33	49	65	81	97	113
0	0	1	0	2	18	34	50	66	82	98	114
0	0	1	1	3	19	35	51	67	83	99	115
0	1	0	0	4	20	36	52	68	84	100	116
0	1	0	1	5	21	37	53	69	85	101	117
0	1	1	0	6	22	38	54	70	86	102	118
0	1	1	1	7	23	39	55	71	87	103	119
1	0	0	0	8	24	40	56	72	88	104	120
1	0	0	1	9	25	41	57	73	89	105	121
1	0	1	0	10	26	42	58	74	90	106	122
1	0	1	1	11	27	43	59	75	91	107	123
1	1	0	0	12	28	44	60	76	92	108	124
1	1	0	1	13	29	45	61	77	93	109	125
1	1	1	0	14	30	46	62	78	94	110	126
1	1	1	1	15	31	47	63	79	95	111	127

In the ASCII coding scheme, information (a number or alphabetic character) is represented by the value of a data unit called a "byte." One byte represents one character There are eight bits in one byte Bits are the data units actually stored as either a plus (1) or minus (0) electrical charge Computers read stored bits sequences and convert the bits into bytes and into the codes that represent character-based information

Sample Byte (Bit Settings)

8 7 6 5 4 3 2 1
1 1 0 0 0 0 0 1 = 65 = letter "A"
0 0 1 1 1 0 0 0 = 56 = number "8"

ASCII Code-to-Character Conversion

In the ASCII coding scheme, information (a number or alphabetic character) is represented by the value of a data unit called a "byte " The following table shows possible byte values and the characters that each value is used to represent

CODE	CHAR	CODE	CHAR	CODE	CHAR	CODE	CHAR	CODE	CHAR
0	NUL	26	SUB	52	4	78	N	104	h
1	SOH	27	ESC	53	5	79	O	105	i
2	STX	28	FS	54	6	80	P	106	j
3	ETX	29	GS	55	7	81	Q	107	k
4	EOT	30	RS	56	8	82	R	108	l
5	ENQ	31	US	57	9	83	S	109	m
6	ACK	32	SP	58	:	84	T	110	n
7	BEL	33	!	59	;	85	U	111	o
8	BS	34	"	60	<	86	V	112	p
9	HT	35	#	61	=	87	W	113	q
10	LF	36	$	62	>	88	X	114	r
11	VT	37	%	63	?	89	Y	115	s
12	FF	38	&	64	@	90	Z	116	t
13	CR	39	'	65	A	91	[	117	u
14	SO	40	(	66	B	92	\	118	v
15	SI	41	)	67	C	93	]	119	w
16	DLE	42	*	68	D	94	^	120	x
17	DC1	43	+	69	E	95	_	121	y
18	DC2	44	,	70	F	96	`	122	z
19	DC3	45	-	71	G	97	a	123	{
20	DC4	46	.	72	H	98	b	124	|
21	NAK	47	/	73	I	99	c	125	}
22	SYN	48	0	74	J	100	d	126	~
23	ETB	49	1	75	K	101	e	127	DEL
24	CAN	50	2	76	L	102	f		
25	EM	51	3	77	M	103	g		

TERInet Services

Centre for Information Technology

TERInet Services

Introduction

TERI being a research institute, information sharing, workgroup productivity and personal productivity enhancement are important factors in IT infrastructure setup of the institute

TERInet services are the IT tools and services offered from TERI's Local Area Network and Wide area Network Making use of the latest softwares and IT infrastructure, theses services aim at better collaboration among professionals, better and faster communication and easier access to varied resources

TERInet services are available to all valid LAN users on TERInet from their desktop To access these services, one need to Log into TERInet and run the respective programs.

These services are categorized under
Information Sharing,
WorkGroup applications, and
Productivity enhancement

TERInet Information sharing

TERInet Information sharing services help disseminating data, information and services that are generated by various group within the institute These information are stored at a single location on LAN and are shared by all LAN users The list of services that are available under this category include

- TERInet Online INFO
- TERInet Online Databases
- Online Training Facilities
- Internet Access (through VSNL IP and Leased line)
- Project and Area information sharing
- Common application packages

TERInet INFO service

This is a network program developed at TERI and it allows to access the following information and services from each desktop.

- TERI Employee Address list
- Telephone directory
- Tour list
- Ongoing project and programme list
- Calender of events
- TERI Publications catalog
- Library and DIC Services
- Other office procedures
- About TERInet services

The TERInet INFO program is currently available under DOS environment We have plans to put these services on TERI IntraNet to make them available from TERI web browser

TERInet Database Services

TERI in its various research projects generate, collect, and procure enormous amount of statistical and numerical data TERI has also developed different computerized energy databases, bibliographic databases and has a collection of CDROM databases These data are organised and put together and are made available on LAN In addition to these, the TERI Library Catalog database is also accessible from LAN The TERInet database service includes access to

- Statistical and Numerical databases
- Bibliographic databases
- CDROM collections
- Library catalog

TERInet database services are available both under DOS and Windows platform Under DOS, this service is accessible from a single program The program provides a complete list of all the databases that are available on LAN and on selection of an option, it runs the respective database programs Some of these databases are not accessible under Windows The databases that are accessible from Windows are listed as icons under TERInet group.

TERInet Online training facilities

TERI's Centre for Information Technology group organizes regular inhouse training programs on different application software that are used within TERI. For some of the most popularly used softwares within TERI, we procured the Online Tutors' and made them available on LAN These tutors can be accessed by any TERInet user from their desktop. Currently these tutors are in the form of reading materials and graphical demonstartions
Our future plan is to put multimedia training facilities on TERInet

Internet Access (VSNL IP and Leased line)

Leased line Internet is accessible from each alternate floors of TERI main block and from the TERI Library block. The VSNL IP dial-up connection is accessible at the TERI Centre for Information Technology

Project and Area Information Sharing

In TERI, Area is a group consisting of specific number of professionals and supporting staffs Each area has area specific sets of information which are often required to be referred by members of that area. For example, area's address database, research publications published by members of that area, minutes of area meetings etc Similarly, a project group consists of members from one or more areas Members within a project group need to work in a closely knit environment and share information among themselves Also, once the project is over, the information and data generated during the project work need to be archived in an organized manner so that retrieval of information at a later date becomes easier and faster.

Standard computer filing structure on TERInet
Most of the area and project related information and data are stored as electronic files on individual computers assigned to professionals To share these information and data among members of area / project, standard filing structures are designed for storing these information and data. These standard structures are created on LAN on the server project volume (separately assigned to create area / project directories) for each research area and on initiation of each research project Members of area/project are assigned required rights to work on these directories on LAN and access the information

Sharing, managing and archiving of project information on TERInet provides an ideal base and security for all the research and other professional output during and after the completion of the activities.

Common application packages on LAN

In TERI, professional need to use different software application packages for their project work. But all the application packages are not always required by them for every project To save unnecessary occupation of computer resources, a common application volume is created on TERInet server to keep the most commonly used application software packages Any TERInet users can install or uninstall these application packages from their desktop without the need to use floppies or CDs to install these packages This facility saves time and effort of the issuing authority and also saves unnecessary occupation of valuable computer resources. Since a TERInet user can install a package whenever needed, he/she will not unnecessarily load the local hard disk with all software which are used sparsly

WorkGroup Productivity Applications

The Groupware workgroup application software on TERInet and the Internet mail accomplishes communication and collaboration among TERInet users Workgroup tools enable TERIites, sitting right at the desk-top, to communicate, both within and outside TERI, by e-mail and Internet mail, schedule meetings, book common resources, maintain personal diaries, and share all forms of information on TERInet The workgroup tools on TERInet allows a LAN user the following tasks

Send and receive mails

Using a single e-mail system TERInet users can send and receive mails, appointments, notes, tasks, faxes etc. The single InBox and OutBox hold all incoming and outgoing messages The OutBox lets you know the status of each message, if and when messages are delivered, opened and deleted; the status of a task, acceptance/ rejection/delegation of a meeting etc

Distribute mails to a group

All valid TERInet users are members of TERInet mailing system's post office. Within this post-office, different distribution lists are created by grouping together members with similar interests All members of a distribution lists can be addressed simultaneously by sending a single mail to the list name This distribution lists are also known as public groups. Statistics show that a multicast message reaches 150 people out of 300 potential users within an hour, indicating the speed at which information flows without using a single sheet of paper.

Schedule meetings and workplans, Assign tasks, Book resources

Project groups assign tasks, hold meetings and book resources with least time and no support from any other office infrastructure. Most of the common resources at TERI, like Laptops, Meeting Rooms, Exhibition/Board rooms are part of TERInet workgroup resource list.

Application programing Interface with e-mail system

Application programming Interface gateway, commonly known as API gateway, is used to distribute slips, reports, greetings, etc. generated using application programs, straight into the message mailbox without waste of a single paper. In TERI, API gateway is used to distribute salary slips, conveyance slips, medical claim report, birthday greetings, etc., generated from personal and payroll database system to the individuals mailboxes

Facsimile from desktop e-mail system

The Fax gateway on TERInet allows to send/receive faxes from/within e-mail system from any desktop without the need to take a printout TERInet users can fax messages from any source application from their desktop using e-mail software, to a fax machines The message gets converted electronically into fax format and sent to destination fax machines The incoming faxes get automatically routed to the e-mail inbox. The status of outgoing faxes can be monitored from the e-mail outbox.

Electronic Form Processing and Office automation

Work flow applications installed on TERInet automates all the form processing in the office environment. The paper forms used for personnel, accounts, purchase and other procedures are being converted into electronic forms. These electronic forms can be accessed, filled up and submitted from the e-mail system by any TERInet user from their desktop
These electronic forms automatically routes through all mailboxes required for authorization and on completion of the routing channel updates the respective database.

Future plans

We are in the process of upgrading our Workgroup productivity application packages on TERInet to include Universal mailbox to hold all incoming and outgoing communications namely, e-mails, voice mails, Internet messages, appointments, faxes, forms, documents, etc. Workgroup collaborative applications like discussion forums, group conferencing and other features like telephony integration, remote access for telecomuting

Personal Productivity Enhancement

The workgroup feature of TERInet e-mail system enhances the productivity of TERInet users. Some of the important tasks that enhances personal productivity are

Mail management

Since a single InBox and OutBox hold all incoming and outgoing messages, one can define folders for a proper document management. By defining rules, messages can be automatically transferred to respective folders
The mailbox can be managed in the absence of the mailbox owner by a proxy assigned by the mailbox owner

Maintain personal calender

The workgroup feature of TERInet e-mail system, allows a LAN user to maintain, update their personal diaries. The personal diary automatically intimates the owner when the appointment is due.

Online Search for professional time-slots and resources availability

The schedule meeting feature of TERInet e-mail system allows to search for a common free time-slot of all the members. before fixing up any meeting, without personally visiting any member Once a meeting is fixed the personal calendar automatically gets updated.
All commonly sharable resources of TERI are included in resource list of TERInet e-mail system. While booking resources, TERInet users can search for availabilty of that resources without visiting the resource manager The resource manager can also maintain these resources effectively without any manual intervention

LAN remote printing

Printing can be initiated from any application from any desktop on TERInet. TERInet members can share printing services available at different places within TERI Once a remote printing is initiated, the status of print queue can be monitored from the desktop itself

CD-ROMs

* The Basics
* What are CD-ROMs used for?
* CD Standards and Formats
* Burning Your Own CD - How It Works
* The Future of CDS
* CD-ROM Technology Summary
* Deploying CD-ROM Services
* Indian Providers
* CD-ROM references/Recommended readings

The Basics

CD-ROM, which stand for Compact Disc Read-Only Memory, is now widely used as a vehicle to distribute information "Read-Only" means that you can only view the contents of the CD-ROM, with a CD-ROM player, but you can't alter any of the information contained on the disc "Writable" discs are those you can "burn" information onto, including such formats as CD-ROM/XA, CD-I, Karaoke CD, Photo CD, Video CD, Audio CD, CD Plus, and all other CD formats

CD-ROM is a mass storage medium utilizing an optical laser to read microscopic pits on the aluminized layer of a polycarbonate disc The same format is used for audio Compact Discs Because of its high storage capacity, reliability, and low cost, CD-ROM has become an increasingly popular storage media

The storage capacity of a CD-ROM disc is approximately 650 megabytes, equivalent to over 500 high density 3 5" floppy disks or roughly 250,000 typed pages

First generation drives (known as single speed), provide a transfer rate of approximately 150 kilobytes per second[1X], these are now generally considered obsolete Double speed drives (300 kilobytes per second)[2X] are widely available, and many users are now opting for quad speed (600 kilobytes per second)[4X], (900 kilobytes per second)[6X], (1200 kilobytes per second)[8X], (1500 kilobytes per second)[10X], (1800 kilobytes per second)[12X], and even (2400 kilobytes per second)[16X]

Most CD-ROM drives use either the Small Computer Systems Interface (SCSI), ATAPI enhanced IDE interface, or a vendor proprietary interface They also typically support playing audio CDS via an external headphone jack or line level output Some CDS also allow reading the frames of data from audio CDS in digital form

CD-ROMs are usually formatted with an ISO-9660 (formerly called High Sierra) file system This format restricts filenames to the MS-DOS style (8+3 characters) The Rock Ridge Extensions use undefined fields in the ISO-9660 standard to support longer filenames and additional Unix style information (e g file ownership, symbolic links, etc)

CD-ROMs usually contain a woven stream of digital image, audio, video and text data, as opposed to Red Book-standard Compact Discs, which contain only audio data Enhanced music CDS are currently all the rage, with the first track containing multimedia data -- text, images, audio clips and videos of and about the artist

What are CD-ROMs used for?

CD-ROMs are used to distribute a wide variety of information, from multimedia encyclopedias to living books to games to image and video libraries to product and sales presentations, and more

The advantage is that it's a portable media, and can contain a large amount of data CD-ROMs are ideal for archiving, and makes specific information easily and quickly accessible

CD Standards and Formats

All of the following fall under the write-once Orange book specifications The separate "books" describe technical specifications of each kind of disc

- Red Book This is the common audio CD, containing only audio data
- Red Book Plus

  Mixed Mode CDS

  In a "Mixed Mode CD," there's data on first track, with audio on rest of the tracks However, some CD players are not smart enough to automatically skip over the first track, and there's a chance you might blow out your speakers if you play the first data track with your audio CD player

  Enhanced CD's

  In enhanced CD's, the audio comes first, followed by the data on the last track The advantage is that you won't damage your audio CD player, because it won't even see the data on the last track

- Yellow Book

  The original standard for CD-ROM Single session with two modes of error checking
  - Mode 1 The most commonly used CD data format Features maximum error checking Used for program files and critical data
  - Mode 2 Uses less error checking, thus freeing more of the block for data Used with graphics, sound, and non-critical data

- Orange Book

  Extension of Yellow Book that specifies CD-Recordable media and format

- CD-ROM/XA (Extended Architecture)
  Specifies Multiple Session and Photo CD formats

- Orange Book, Part II
  CD-Recorders, or CD-Rs, are the machines that allow you to make your own compact discs or CD-ROMs The advantage of making your own discs is three-fold
  - It's cheaper - you make the initial "one-off," or gold master, which then goes to a duplication house The discs are then reproduced in volume, usually ending up costing less than $1 each
  - Ability to make limited editions - if you're using the discs for archiving purposes, or only making a small number, a CD-R is ideal
  - Privacy - again, only if you're making a small number, and the information on the disc is sensitive

  Orange Book, Part III
  CD-Rewritable (Erasable)
  - This format allows you not only to write your own CD, it also allows you to alter the information, rewrite (erase)
  - This format makes your CD a Data Storage/Retrieval device
  - Products produced in accordance to this format play back all CD-ROM discs, can use CD-Recordable disc to publish data/software and can use CD-Rewritable disc for data backup
  - CD-Rewritable discs cannot be played on the current CD-ROM drives However, the new generation of CD-ROM players will be able to read these discs

  Green Book
  - CD-I
  - Developed in 1987 by Philips, CD-I (for CD-Interactive), supports the new stand-alone CD players that feature full-motion MPEG video and audio decompression technology, and connects to your TV CD-I's are mostly used for the new breed of 3D video games

- Bridge Discs
  - Beige Book - Kodak Photo CD
  - Hybrid discs used to distribute high-quality photo images These can be played on any CD-I or CD-ROM player

- White Book - Video CD
- Typically known as Karaoke discs. These can be played back on any CD-ROM, CD-I, or Karaoke CD players.

Burning Your Own CD - How It Works

"Writable" CDS, that is, CD-R discs, consist of a microscopic gold reflective layer and a photosensitive dye layer sandwiched between a protective lacquer coating and a polycarbonate substrate. The substrate has a microscopic groove spiraling around the data track of the disc, which helps the laser stay on course.

The data burned on a CD-ROM consists of "pits" and "lands." To make a "pit," the CD-R "burns" off pieces of the dye with short bursts of the laser. The untouched part of the disc, the gold portions, become the "lands." The lands are a highly reflective surface, which is then "read" by the laser of a CD-ROM player. The player interprets the data by "reading" the 0s and 1s represented by the pits and lands.

Both CD-Rs and CD-ROM players come in different speeds. The most common is double-speed, which means that it reads or writes at twice the speed of conventional CD-ROM recorders and/or players (150kbps). The term 1x, 2x, and so forth relate to the speed of audio CDS which are the root of all CD standards. The higher the speed, the faster the writing speed or, when reading, the "access" and "seek" times. Four-speed players are becoming the norm, with 6 and even 8-speed bringing up the rear. All these players are relatively low-cost.

To burn CDS, you'll also need CD-ROM recording software, which usually comes with the CD-R.

The Future of CDS

The next generation of CD-ROMs are called "high-density," and contains up to 4.7GB of storage on a single layer and on a single side. The capacity can be increased to 8.5GB by making the discs double-layered, which means the laser now reads through two substrate levels, and thus the CD contains double the information in the same vertical space. This is the new standard called DVD, recently agreed upon by CD manufacturers. DVDs will be able to store entire full-length movies on the space of a regularly-sized disc. Beyond that, double-layered, double-sided discs are waiting on the horizon, which will be able to store 26 times the amount of data of a conventional CD-ROM disc -- up to 17GB.

CD-ROM Technology Summary

CD-ROM is based on the highly successful CD audio technology developed by Philips and Sony in the early 1980's The CD-ROM disk uses the same basic data storage format as a CD audio disk CD audio stores an hour of 16-bit digitized audio sampled at 44 1 kHz in two channels (stereo) on a 7 ounce, 120-mm (4 72 inch) polycarbonate plastic disk

In fact, CD-ROM data blocks are identified by minute, second and sector number, following the audio format Information is recorded on a three-mile spiral of small pits in a plastic substrate from the inner to outer radius of the disk The surface is coated with a reflective metal layer (usually aluminum), which is then coated with a protective lacquer Tracks are made up of 6 micron pits with a depth of 12 microns spaced at 1 6 microns (20,000 tracks per disk) The tracks are read with a gallium-arsenide laser beam, which must track the small spiral despite recording irregularities in horizontal and vertical directions which are hundreds of times the size of the track

Each raw data block contains 2,352 bytes of information, with 304 bytes used for housekeeping and error correction and 2,048 (2K) containing user data Each data block is called a sector, and 75 sectors are stored per second Since the nominal playing time of a CD disk is 60 minutes, the data storage capacity is 75 sectors per second * 60 seconds per minute * 60 minutes or 270,000 sectors Thus the nominal storage capacity of a single CD-ROM disk is 540,000 kilobytes, which can be safely extended to 675,000 kilobytes by recording 75 minutes of data on a disk

In order to maximize the storage capacity of CD disks a constant linear velocity (CLV) recording format is used This means that the player changes speed (slows down) as it reads from the inside to the outside of the disk, to maintain a constant flow of data under the read mechanism at a speed of 1 2 meters per second This is in contrast to most magnetic disk drives which use constant angular velocity (CAV) storage, where the information density is greater on the inner tracks then the outer tracks While the use of CLV recording increases the storage capacity of CD-ROM disks, it reduces access time, since the disk must change speeds as it moves to different positions on the disk radius The strategy for locating a recorded data block is also more complicated than with constant angular velocity recording technology

As a result the average access time of CD-ROM drives is between 400 ms and 1 s, and the maximum data transfer rate to the host computer is 150 kilobytes per second These rates are approximately an order of magnitude slower than magnetic disks, although in practice, throughput is roughly 75 percent of magnetic disk rates Therefore, the access mechanisms to disk directories and data must be customized for CD-ROM in order to provide acceptable performance

The data recording format for compact disk includes cross- interleaved Reed-Solomon (CIRC) coding which provides a bit error rate (ber) of 10-9 CD-ROM disks also provide a Layered ECC which results in a ber (if used) of 10-12 This corresponds to one block error in reading 2,000 disks

The development of a standard logical format for recording data files on CD-ROM was taken on by a group of CD-ROM applications developers, hardware vendors, and computer vendors The proposed standard resulting from this effort is called the High Sierra format This format was submitted to the International Standards Organization (ISO) for consideration and approved on October 5, 1987, with the standard formally published and supported by the industry in April 1988 (ISO 9660, "Information processing-Volume and file structure of CD-ROM for information processing") The logical format standard supports a hierarchical file structure optimized for read-only use A shorthand version of the CD-ROM directory (the path table) is stored in the host computer's RAM, allowing access to the directory entry for a data file with only one seek, greatly improving performance (Note this is possible only if directory sizes are kept to about 40 files per directory)

Other standards specify the physical recording format of CD-ROM (ECMA/TC31/88/1, "Data Interchange On Read-only 120-mm Optical Data Disks (CD-ROM)"), and the specification for audio recording on compact disk (IEC908, "Compact disk digital audio system ") The level of standardization achieved in a fairly short time with CD-ROM makes it likely that it will become one of the most transportable storage media ever developed

CD-ROM disk replicas are mass-produced, unlike magnetic replicas which must generally be made on a one-at-a-time basis This reduces the cost per replica to a fraction of the cost of magnetic replicas (currently $2 to $4 per replica) As a rule- of-thumb, CD-ROM becomes more cost effective than magnetic tape when 10 or more copies are required

CD-ROM disks are resident to all normal operation threats The storage life of CD-ROM disks is rated at 10 years, and many industry experts expect 40 years to be a reasonable life, making them excellent for archival products In 4 years of testing, the PDS has encountered only one unreadable disk, caused by a scratch covering the primary volume descriptor record No read errors have been reported by the recipients of nearly five-hundred PDS CD-ROMs

CD-ROMs are a manufactured media User data is supplied to a vendor on magnetic tape for disk mastering and replication Generally, a pre-mastering process is also required, which adds the information needed to build the CD-ROM logical structure (VTOC, directories, etc) to the user data The cost of these processes can range from $1,300 to $10,000 depending on the complexity of the user data structure and the amount of assistance required by the user in the data preparation and pre- mastering processes The cost of a mastering plant in between $5 and $25 million Recording devices for single unit or low-volume disk production have recently become available for about $100K with blank disks priced at $100 each

Deploying CD-ROM services

Stand-alone environment

A novice or a person with little knowledge of computers would be able to deploy the CD-ROM services in an stand-alone environment

Networked environment

It takes expertise and experience to create a fully functional network CD-ROM server This task is normally assigned to an experienced network manager or outside consultant To deploy the CD-ROM services in a networked environment, you need the following

* Personal Computer and desktop operating system
* CD-ROM interface cards (normally SCSI-Small Computer Systems Interface)
* CD-ROM device drivers
* Network Interface Card and device driver
* Tower enclosure for holding CD-ROM drives or multichangers
* CD-ROM drives
* Interconnecting cables
* CD-ROM Server software

Indian Providers

CD-ROM Autochangers

1 Product Pioneer DRM-624X, DRM-1804X, DRM-1004X, DRM-5004X

Vendor Integra Micro Systems (P) Ltd
G5 Swiss Complex, 33 Race Course Road,
Bangalore 560 001
Tel (080)225 0073
Fax (080)220 3928
E-mail integra@giasbg01 vsnl net in

CD-ROM Drives & CD-Rs

Product brand Sony, Hitachi, Creative, Hewlett Packard, and others

Vendor Contact any computer dealer

CD-ROM references/Recommended readings

References

1 Buddine, L , Young, E , "The Brady to CD-ROM " New York, NY, Brady Books
2 Lambert, S , Ropiequet, S , "CD-ROM, The New Papyrus " Redmond, Wn Microsoft Press
3 Lambert, S , Ropiequet, S , "CD-ROM, Optical Publishing " Redmond, Wn Microsoft Press
4 Oberlin, S , Cox, J , "Microsoft CD-ROM Yearbook " Redmond, Wn Microsoft Press

Readings

1 Rathbone, A , "Multimedia and CD-ROMs for Dummies" New Delhi, Pustak Mahal
2 Oppenhei M , Charles, "CD-ROM fundamentals to applications"New Delhi, Aditya Book Private Limited

Selected CD-ROMs available at TERI

Ei Energy and Environment Disc 1984–1996

Operating System . DOS/Windows

Contents and other details DIALOG on Disc (r) Ei ENERGY AND ENVIRONMENT DISC (EEED) (tm) provides coverage of the world's significant literature on energy and environmental engineering and related technical literature EEED is produced by (Ei) Engineering Information Inc., and corresponds to portions of the print publication *The Engineering Index* Subject coverage includes the various aspects of energy and environmental engineering and related topics and technologies EEED contains references to and abstracts from journals technical reports, books, proceedings, conference papers, and more. Author prepared abstracts are used when available publications from around the World are indexed EEED also has approximately 64 000 records per year of coverage. The sources are journals publications of engineering societies and organizations, conferences, technical papers, and monographs. Approximately 10% of the documents indexed are in a language other than English. The subjects covered are given below.

- Air and water pollution
- Direct energy conversion
- Electric power transmission
- Energy Conservation, distribution, storage and management
- Environmental protection
- Gas liquid and solid fuels
- Geology, geochemistry and geophysics
- Hazardous materials
- Nuclear, steam and hydroelectric power plants
- Nuclear fusion energy
- Solar energy
- Waste disposal and treatment

EEED is derived from COMPENDEX* PLUS (tm) database, which is available online on DIALOG as File 8 File 8 covers material from 1970 to the present with a total of over 2.6 million records

16th World Energy Council Congress on CD ROM

Operating System DOS

Contents and other details The Congress was held from 8–13 October 1995 at the Nippon Convention Center (Makuhari Messe), Greater Tokyo There were

- four Keynote Addresses,
- two Special Congress Addresses on possible climate change and industry quality management,

- two Global Energy Address sessions on the geopolitics of energy and managing energy systems in the 21st century,
- eight Working Group sessions on the 1992–95 World Energy Council studies and Reports,
- six Round Tables, and
- thirteen Paper sessions which reflected the 245 technical papers presented to the Congress.

These are available in four main divisions

- Energy and Economic Development
- Future Sustainable Energy Supply
- More Efficient Use of Energy
- Energy for a Better Environment

World Atlas

The Software Toolworks Inc 1989, 1990, 1991
Electromap Inc.
Version 2 0

Operating System DOS

Contents and other details Data available on
- Geography
- People
- Education
- Health
- Government
- Crime
- Economy
- Agriculture
- Communication
- Travel

All data sources are the latest available information from each agency at the time of publication of World Atlas Data from all copyrighted sources reproduced with permission While careful efforts have been made to ensure the accuracy of data included in this program, the correctness of information and data cannot be warranted

GREENTIE/IEA and OECD Directory 1996

Operating System DOS

Contents and other details The Greenhouse Gas Technology Information Exchange (GREENTIE) is an initiative of the International Energy Agency (IEA) and the Organization for economic Cooperation and Development (OECD) It supports those who tackle greenhouse gas (GHG) related problems by diffusing and exchanging information on technology GREENTIE builds on the network that the IEA and OECD have established over 20 years in the global communication of information on science and technology among member countries. GREENTIE's service is available to all countries of the world

GREENTIE's information exchange system comprises a worldwide network of information sources Information on organizations and their expertise is available in GREENTIE's own database, the Directory More in-depth information from existing data sources within IEA and the participating countries is available through information links with GREENTIE To obtain information for the Directory, GREENTIE has set up a global network of contacts made up of GREENTIE Liaison Groups (GLGs) in member countries and other organizations such as the IEA and the OECD GLGs have the local knowledge needed to identify information sources for GHG mitigation technologies They are also on hand to distribute GREENTIE's products and to help users make effective use of GREENTIE's facilities The GREENTIE network is coordinated by GREENTIE Centre in the Netherlands

The GREENTIE directory contains the addresses of those who can help put GHG mitigation technologies to work, and with each address, it provides background information on the services and technology provided GREENTIE procures information from R & D institutions, manufacturers and implementing agreements of the IEA and OECD keep detailed information on GHG mitigation technologies and makes it accessible to its users

GREENTIE is a powerful tool for knowledge transfer for the scientific community, provides access to new markets, for suppliers of technology; and an independent and free information service is available for policy planners and decision makers

Factor Information Retrieval (FIRE) System

Operating System DOS

Contents and other details The Factor Information Retrieval (FIRE) system is a database management system for a database of air pollutant emission factors. The US Environmental Protection Agency (EPA) has compiled emission factors from a number of source categories to be used to derive approximations of pollutant emissions for a given emission source Emission factors are not intended to represent actual emissions, but are used to estimate air pollutant emissions when no actual emission data are available

The FIRE database management system is designed to provide easy access to a database of emission factors This database contains emission factors for the 189 hazardous air pollutants (HAPs) designated by the Clean Air Act Amendments of 1990 (CAAA), additional HAPs, and the Clean Air Act *criteria* pollutants Eventually, the database will contain data on the *criteria* pollutants and all 189 of the HAPs specified in the CAAA. This release of the system contains data on 41 of the 189 HAPs and on some other toxic air pollutants

Toxic air pollutants are all air pollutants other than the *criteria* pollutants that could potentially have toxic effects In this initial version of FIRE, 43 toxic air pollutants are included Some are defined by the CAAA as hazardous air pollutants (HAPs), but some toxic air pollutants included in this database are other HAPs not designated by the CAAA.

The FIRE system is periodically updated. The FIRE system is a menu-driven system with a user interface patterned after Microsoft Windows®.

The Air CHIEF CD-ROM Database

Operating System · DOS

Contents and other details The Air CHIEF (Clearing House for Inventories and Emission Factors) database provides information on air pollutants and emission sources consolidated from previously existing United States Environment Protection Agency (US EPA) reports and databases on one CD-ROM. The reports and data from the databases in Air CHIEF, as well as the CD, are all products of the Emissions Inventory Branch (EIB), Technical Support Division, Office of Air Quality Planning and Standards (OAQPS) at the EPA, Research Triangle Park, North Carolina. EIB provides the convenient Air CHIEF CD-ROM as a useful complement to the OAQPS Technology Transfer Network (TTN) CHIEF bulletin board system (BBS) The Air CHIEF Software may be used to quickly locate air emissions data for pollutants or emission sources contained in the Air CHIEF database These data may be used to provide preliminary, order-of-magnitude estimates of source emissions, however, they should not be considered substitutes for actual source tests The emissions data in Air CHIEF should be used with further caution because the data are of varying quality, depending upon the particular data source within Air CHIEF.

The contents of the Air CHIEF database are grouped by datasets Generally, the highest quality data in the database are contained in the ELPA document 'AP-42 - *The Compilation of Air Pollutant Emission Factors* Volume I, Stationary Point and Area Sources and Supplements A through F.' Emission factors contained in this document are developed using strict guidelines The other Air CHIEF documents comprise the EPA report series entitled, 'Locating and Estimating Air Emissions ' (L&Es) The emission factors in the L&Es are not subject to the same strict development guidelines required for AP-42 and, consequently, may be of lower quality. Air CHIEF also contains data from the following sources. 1) the volatile organic compound (VOC)/particulate matter (PM) Speciation (SPECIATE) database management system, 2) the crosswalk/air toxic emission factor (XATEF) database management system, 3) California Air Resources Board emission source test data (CARB), and 4) the Airs Facility Subsystem and Emission Factor (AFSEF) database system Generally, the CARB emission factors are of higher quality However, most of the emission factors obtained from XATEF, CARB, and AFSEF have quality ratings and notes on the derivation of the emission factors The data in Air CHIEF is kept current by EIB EIB updates the CD annually with latest L&E reports, new editions and supplements to AP-42, and the latest data from SPECIATE and XATEF

3rd DAY

E-MAIL

THE BASICS

Electronic mail, or e-mail, is your personal connection to the world of the Net

All of the millions of people around the world who use the Net have their own e-mail addresses A growing number of "gateways" tie more and more people to the Net every day When you logged onto the host system you are now using, it automatically generated an address for you, as well

The basic concepts behind e-mail parallel those of regular mail. You send mail to people at their particular addresses In turn, they write to you at your e-mail address You can subscribe to the electronic equivalent of magazines and newspapers You might even get electronic junk mail

E-mail has two distinct advantages over regular mail The most obvious is speed Instead of several days, your message can reach the other side of the world in hours, minutes or even seconds (depending on where you drop off your mail and the state of the connections between there and your recipient) The other advantage is that once you master the basics, you'll be able to use e-mail to access databases and file libraries You'll see how to do this later, along with learning how to transfer program and data files through e-mail.

E-mail also has advantages over the telephone You send your message when it's convenient for you Your recipients respond at their convenience No more telephone tag And while a phone call across the country or around the world can quickly result in huge phone bills, e-mail lets you exchange vast amounts of mail for only a few pennies -- even if the other person is in New Zealand

E-mail is your connection to help -- your Net lifeline The Net can sometimes seem a frustrating place! No matter how hard you try, no matter where you look, you just might not be able to find the answer to whatever is causing you problems But when you know how to use e-mail, help is often just a few keystrokes away you can ask your system administrator or a friend for help in an e-mail message

The quickest way to start learning e-mail is to send yourself a message Most public-access sites actually have several different types of mail systems, all of which let you both send and receive mail We'll start with the simplest one, known, appropriately enough, as "mail," and then look at a couple of other interfaces. At your host system's command prompt, type.

```
mail username
```

where username is the name you gave yourself when you first logged on. Hit enter. The computer might respond with

```
subject
```

Type

```
test
```

or, actually, anything at all (but you'll have to hit enter before you get to the end of the screen) Hit enter

The cursor will drop down a line You can now begin writing the actual message Type a sentence, again, anything at all And here's where you hit your first Unix frustration, one that will bug you repeatedly you have to hit enter before you get to the very end of the line Just like typewriters, many Unix programs have no word-wrapping (although there are ways to get some Unix text processors, such as emacs, to word-wrap)

When done with your message, hit return. Now hit control-D (the control and the D keys at the same time) This is a Unix command that tells the computer you're done writing and that it should close your "envelope" and mail it off (you could also hit enter once and then, on a blank line, type a period at the beginning of the line and hit enter again)

You've just sent your first e-mail message And because you're sending mail to yourself, rather than to someone somewhere else on the Net, your message has already arrived, as we'll see in a moment

If you had wanted, you could have even written your message on your own computer and then uploaded it into this electronic "envelope " There are a couple of good reasons to do this with long or involved messages One is that once you hit enter at the end of a line in "mail" you can't readily fix any mistakes on that line (unless you use some special commands to call up a Unix text processor) Also, if you are paying for access by the hour, uploading a prepared message can save you money Remember to save the document in ASCII or text format Uploading a document you've created in a word processor that uses special formatting commands (which these days means many programs) will cause strange effects

When you get that blank line after the subject line, upload the message using the ASCII protocol Or you can copy and paste the text, if your software allows that When done, hit control-D as above

Now you have mail waiting for you Normally, when you log on, your public-access site will tell you whether you have new mail waiting To open your mailbox and see your waiting mail, type

```
mail
```

and hit enter

When the host system sees "mail" without a name after it, it knows you want to look in your mailbox rather than send a message Your screen, on a plain-vanilla Unix system will display

```
Mail version SMI 4 0 Mon Apr 24 18 34 15 PDT 1989  Type ? for help
"/usr/spool/mail/adamg"  1 message 1 new 1 unread

>N 1 adamg           Sat Jan 15 20 04   12/290   test
```

Ignore the first line, it's just computerese of value only to the people who run your system You can type a question mark and hit return, but unless you're familiar with Unix, most of what you'll see won't make much sense at this point

The second line tells you the directory on the host system where your mail messages are put, which again, is not something you'll likely need to know The second line also tells you how many messages are in your mailbox, how many have come in since the last time you looked and how many messages you haven't read yet.

It's the third line that is of real interest -- it tells you who the message is from, when it arrived, how many lines and characters it takes up, and what the subject is The "N" means it is a new message -- it arrived after the last time you looked in your mailbox. Hit enter And there's your message -- only now it's a lot longer than what you wrote!

```
Message 1
From adamg Jan 15 20 04 55 1994
Received  by eff org id AA28949
(5 65c/IDA-1 4 4/pen-ident for adamg), Sat, 15 Jan 1994 20 04 55 -0400
(ident-sender  adamg@eff org)
Date  Sat, 15 Jan 1994 21 34 55 -0400
From  Adam Gaffin <adamg>
Message-Id  <199204270134 AA28949@eff org>
To  adamg
Subject  test
Status  R

This is only a test!
```

Whoa! What is all that stuff? It's your message with a postmark gone mad Just as the postal service puts its marks on every piece of mail it handles, so do Net postal systems Only it's called a "header" instead of a postmark Each system that handles or routes your mail puts its stamp on it Since many messages go through a number of systems on their way to you, you will often get messages with headers that seem to go on forever Among other things, a header will tell you exactly when a message was sent and received (even the difference between your local time and Greenwich Mean Time -- as at the end of line 4 above)

If this had been a long message, it would just keep scrolling across and down your screen -- unless the people who run your public-access site have set it up to pause every 24 lines One way to deal with a message that doesn't stop is to use your telecommunication software's logging or text-buffer function Start it before you hit the number of the message you want to see Your computer will ask you what you want to call the file you're about to create After you name the file and hit enter, type the number of the message you want to see and hit enter When the message finishes scrolling, turn off the text-buffer function The message is now saved in your computer This way, you can read the message while not connected to the Net (which can save you money if you're paying by the hour) and write a reply offline

But in the meantime, now what? You can respond to the message, delete it or save it To respond, type a lowercase r and hit enter You'll get something like this

```
To  adamg
Subject  Re  test
```

Note that this time, you don't have to enter a user name The computer takes it from the message you're replying to and automatically addresses your message to its sender The computer also automatically inserts a subject line, by adding "Re " to the original subject From here, it's just like writing a new message But say you change your mind and decide not to reply after all How do you get out of the message? Hit control-C once You'll get this

```
(Interrupt -- one more to kill letter)
```

If you hit control-C once more, the message will disappear and you'll get back to your mail's command line

Now, if you type a lowercase d and then hit enter, you'll delete the original message Type a lowercase q to exit your mailbox

If you type a q without first hitting d, your message is transferred to a file called mbox This file is where all read, but un-deleted messages go If you want to leave it in your mailbox for now, type a lowercase x and hit enter This gets you out of mail without making any changes

The mbox file works a lot like your mailbox To access it, type

```
mail -f mbox
```

at your host system's command line and hit enter

You'll get a menu identical to the one in your mailbox from which you can read these old messages, delete them or respond to them It's probably a good idea to clear out your mailbox and mbox file from time to time, if only to keep them uncluttered

Are there any drawbacks to e-mail? There are a few One is that people seem more willing to fly off the handle electronically than in person, or over the phone. Maybe it's because it's so easy to hit r and reply to a message without pausing and reflecting a moment That's why we have smileys! There's no online equivalent yet of a return receipt chances are your message got to where it's going, but there's no absolute way for you to know for sure unless you get a reply from the other person

So now you're ready to send e-mail to other people on the Net Of course, you need somebody's address to send them mail How do you get it?

Alas, the simplest answer is not what you'd call the most elegant you call them up on the phone or write them a letter on paper and ask them Residents of the electronic frontier are only beginning to develop the equivalent of phone books, and the ones that exist today are far from complete (still, later on, in Chapter 6, we'll show you how to use some of these directories)

Eventually, you'll start corresponding with people, which means you'll want to know how to address mail to them It's vital to know how to do this, because the smallest mistake -- using a comma when you should have used a period, for instance, can bounce the message back to you, undelivered In this sense, Net addresses are like phone numbers one wrong digit and you get the wrong person Fortunately, most net addresses now adhere to a relatively easy-to-understand system

Earlier, you sent yourself a mail message using just your username This was sort of like making a local phone call -- you didn't have to dial a 1 or an area code. This also works for mail to anybody else who has an account on the same system as you.

Sending mail outside of your system, though, will require the use of the Net equivalent of area codes, called "domains " A basic Net address will look something like this

tomg@world std com

Tomg is somebody's user ID, and he is at (hence the @ sign) a site (or in Internetese, a "domain") known as std com Large organizations often have more than one computer linked to the Internet, in this case, the name of the particular machine is world (you will quickly notice that, like boat owners, Internet computer owners always name their machines)

Domains tell you the name of the organization that runs a given e-mail site and what kind of site it is or, if it's not in the U S , what country it's located in Large organizations may have more than one computer or gateway tied to the Internet, so you'll often see a two-part domain name, and sometimes even three- or four-part domain names

In general, American addresses end in an organizational suffix, such as " edu," which means the site is at a college or university. Other American suffixes include

com for businesses
.org for non-profit organizations
gov and mil for government and military agencies
net for companies or organizations that run large networks

Sites in the rest of the world tend to use a two-letter code that represents their country Most make sense, such as ca for Canadian sites, but there are a couple of seemingly odd ones Swiss sites end in ch, while South African ones end in za Some U S sites have followed this international convention (such as well sf ca us)

You'll notice that the above addresses are all in lower-case Unlike almost everything else having anything at all to do with Unix, most Net mailing systems don't care about case, so you generally don't have to worry about capitalizing e-mail addresses Alas, there are a few exceptions -- some public-access sites do allow for capital letters in user names When in doubt, ask the person you want to write to, or let her send you a message first (recall how a person's e-mail address is usually found on the top of her message) The domain name, the part of the address after the @ sign, never has to be capitalized

It's all a fairly simple system that works very well, except, again, it's vital to get the address exactly right -- just as you have to dial a phone number exactly right Send a message to tomg@unm edu (which is the University of New Mexico) when you meant to send it to tomg@umn edu (the University of Minnesota), and your letter will either bounce back to you undelivered, or go to the wrong person

If your message is bounced back to you as undeliverable, you'll get an ominous looking-message from MAILER-DAEMON (actually a rather benign Unix program that exists to handle mail), with an evil-looking header followed by the text of your message Sometimes, you can tell what went wrong by looking at the first few lines of the bounced message Besides an incorrect address, it's possible your host system does not have the other site in the "map" it maintains of other host systems Or you could be trying to send mail to another network, such as Bitnet or CompuServe, that has special addressing requirements

Sometimes, figuring all this out can prove highly frustrating But remember the prime Net commandment Ask Send a message to your system administrator He or she might be able to help decipher the problem

There is one kind of address that may give your host system particular problems There are two main ways that Unix systems exchange mail. One is known as UUCP and started out with a different addressing system than the rest of the Net. Most UUCP systems have since switched over to the standard Net addressing system, but a few traditional sites still cling to their original type, which tends to have lots of exclamation points in it, like this:

```
uunet!somesite!othersite!mybuddy
```

The problem for many host sites is that exclamation points (also known as "bangs") now mean something special in the more common systems or "shells" used to operate many Unix computers This means that addressing mail to such a site (or even responding to a message you received from one) could confuse the poor computer to no end and your message never gets sent out If that happens, try putting backslashes in front of each exclamation point, so that you get an address that looks like this

```
uunet\!somesite\!othersite\!mybuddy
```

Note that this means you may not be able to respond to such a message by typing a lowercase r -- you may get an error message and you'll have to create a brand-new message

If you want to get a taste of what's possible through e-mail, start an e-mail message to

```
almanac@oes orst edu
```

Leave the "subject " line blank As a message, write this:

```
send quote
```

Or, if you're feeling a little down, write this instead

```
send moral-support
```

In either case, you will get back a message within a few seconds to a few hours (depending on the state of your host system's Internet connection) If you simply asked for a quote, you'll get back a fortune-cookie-like saying If you asked for moral support, you'll also get back a fortune-cookie-like saying, only supposedly more uplifting

This particular "mail server" is run by Oregon State University Its main purpose is actually to provide a way to distribute agricultural information via e-mail. If you'd like to find out how to use the server's full range of services, send a message to its address with this line in it

```
send help
```

You'll quickly get back a lengthy document detailing just what's available and how to get it

Feeling opinionated? Want to give the President of the United States a piece of your mind? Send a message to president@whitehouse gov Or if the vice president will do, write vice-president@whitehouse gov

The "mail" program is actually a very powerful one and a Netwide standard, at least on Unix computers But it can be hard to figure out -- you can type a question mark to get a list of commands, but these may be of limited use unless you're already familiar with Unix Fortunately, there are a couple of other mail programs that are easier to use

ELM -- A BETTER WAY

Elm is a combination mailbox and letter-writing system that uses menus to help you navigate through mail Most Unix-based host systems now have it online To use it, type

```
elm
```

and hit enter You'll get a menu of your waiting mail, along with a list of commands you can execute, that will look something like this

```
Mailbox is '/usr/spool/mail/adamg' with 38 messages [ELM 2.3 PL11]
```

```
 1  Sep 1  Christopher Davis  (13)  here's another message
 2  Sep 1  Christopher Davis  (91)  This is a message from Eudora
 3  Aug 31 Rita Marie Rouvali (161)  First Internet Hunt !!! (fwd)
 4  Aug 31 Peter Scott/Manage (69)  New File <UK077> University of Londo
 5  Aug 30 Peter Scott/Manage (64)  New File <DIR020> X.500 service at A
 6  Aug 30 Peter Scott/Manage (39)  New File <NET016> DATAPAC Informatio
 7  Aug 28 Peter Scott/Manage (67)  Proposed Usenet group for HYTELNET n
 8  Aug 28 Peter Scott/Manage (56)  New File <DIR019> JANET Public Acces
 9  Aug 26 Helen Trillian Ros (15)  Tuesday
 10  Aug 26 Peter Scott/Manage (151)  Update <CWK004> Oxford University OU


  You can use any of the following commands by pressing the first character,
 d)elete or u)ndelete mail,  m)ail a message,  r)eply or f)orward mail,  q)uit
   To read a message, press <return>  j = move down, k = move up, ? = help
```

Each line shows the date you received the message, who sent it, how many lines long the message is, and the message's subject.

If you are using VT100 emulation, you can move up and down the menu with your up and down arrow keys Otherwise, type the line number of the message you want to read or delete and hit enter.

When you read a message, it pauses every 24 lines, instead of scrolling until it's done Hit the space bar to read the next page You can type a lowercase r to reply or a lower-case q or i to get back to the menu (the I stands for "index")

At the main menu, hitting a lowercase m followed by enter will let you start a message To delete a message, type a lower-case d. You can do this while reading the message Or, if you are in the menu, move the cursor to the message's line and then hit d.

When you're done with elm, type a lower-case q The program will ask if you really want to delete the messages you marked Then, it will ask you if you want to move any messages you've read but haven't marked for deletion to a "received" file For now, hit your n key

Elm has a major disadvantage for the beginner The default text editor it generally calls up when you hit your r or m key is often a program called emacs Unixoids swear by emacs, but everybody else almost always finds it impossible Unfortunately, you can't always get away from it (or vi, another text editor often found on Unix systems), so later on we'll talk about some basic commands that will keep you from going totally nuts

If you want to save a message to your own computer, hit s, either within the message or with your cursor on the message entry in the elm menu. A filename will pop up If you do not like it, type a new name (you won't have to backspace) Hit enter, and the message will be saved with that file name in your "home directory" on your host system After you exit elm, you can now download it (ask your system administrator for specifics on how to download -- and upload -- such files).

PINE -- AN EVEN BETTER WAY

Pine is based on elm but includes a number of improvements that make it an ideal mail system for beginners Like elm, pine starts you with a menu It also has an "address book" feature that is handy for people with long or complex e-mail addresses Hitting A at the main menu puts you in the address book, where you can type in the person's first name (or nickname) followed by her address Then, when you want to send that person a message, you only have to type in her first name or nickname, and pine automatically inserts her actual address The address book also lets you set up a mailing list This feature allows you to send the same message to a number of people at once

What really sets pine apart is its built-in text editor, which looks and feels a lot more like word-processing programs available for MS-DOS and Macintosh users Not only does it have word wrap (a revolutionary concept if ever there was one), it also has a spell-checker and a search command Best of all, all of the commands you need are listed in a two-line mini-menu at the bottom of each screen The commands look like this

```
^W Where is
```

The little caret is a synonym for the key marked "control" on your keyboard To find where a particular word is in your document, you'd hit your control key and your W key at the same time, which would bring up a prompt asking you for the word to look for

Some of pine's commands are a tad peculiar (control-V for "page down" for example), which comes from being based on a variant of emacs (which is utterly peculiar) But again, all of the commands you need are listed on that two-line mini-menu, so it shouldn't take you more than a couple of seconds to find the right one

To use pine, type

```
pine
```

at the command line and hit enter It's a relatively new program, so some systems may not yet have it online But it's so easy to use, you should probably send e-mail to your system administrator urging him to get it!

SMILEYS

When you're involved in an online discussion, you can't see the smiles or shrugs that the other person might make in a live conversation to show he's only kidding But online, there's no body language. So what you might think is funny, somebody else might take as an insult To try to keep such misunderstandings from erupting into bitter disputes, we have smileys Tilt your head to the left and look at the following sideways -) Or simply) This is your basic "smiley " Use it to indicate people should not take that comment you just made as seriously as they might otherwise. You make a smiley by typing a colon, a hyphen and a right parenthetical bracket Some people prefer using the word "grin," usually in this form:

<grin>

Sometimes, though, you'll see it as *grin* or even just <g> for short.

Some other smileys include.

,-) Wink,
.-(Frown,
.-O Surprise,
8-) Wearing glasses,
=| -)= Abe Lincoln

OK, so maybe the last two are a little bogus -).

SENDING E-MAIL TO OTHER NETWORKS

There are a number of computer networks that are not directly part of the Net, but which are now connected through "gateways" that allow the passing of e-mail Here's a list of some of the larger networks, how to send mail to them and how their users can send mail to you

America Online

Remove any spaces from a user's name and append "aol com," to get

user@aol com

America Online users who want to send mail to you need only put your Net address in the "to " field before composing a message

ATTMail

Address your message to user@attmail.com

From ATTMail, a user would send mail to you in this form

internet!domain!user

So if your address were nancyr@world std com, your correspondent would send a message to you at

internet!world std com!nancyr

Bitnet

Users of Bitnet (and NetNorth in Canada and EARN in Europe) often have addresses in this form IZZY@INDVMS If you're lucky, all you'll have to do to mail to that address is add "bitnet" at the end, to get izzy@indvms bitnet Sometimes, however, mail to such an address will bounce back to you, because Bitnet addresses do not always translate well into an Internet form If this happens, you can send mail through one of two Internet/Bitnet gateways First, change the @ in the address to a %, so that you get username%site bitnet Then add either @vm marist edu or @cunyvm cuny edu, so that, with the above example, you would get izzy%indyvms bitnet@vm marist edu or izzy%indvyvms bitnet@cunyvm cuny edu

Bitnet users have it a little easier They can usually send mail directly to your e-mail address without fooling around with it at all So send them your address and they should be OK

CompuServe

CompuServe users have numerical addresses in this form 73727,545 To send mail to a CompuServe user, change the comma to a

period and add "@compuserve com", for example
73727 545@compuserve com

Note that some CompuServe users must pay extra to receive mail from the Internet

If you know CompuServe users who want to send you mail, tell them to GO MAIL and create a mail message In the address area, instead of typing in a CompuServe number, have them type your address in this form,

>INTERNET YourID@YourAddress

For example, >INTERNET adamg@world.std com Note that both the ">" and the " " are required

Delphi

To send mail to a Delphi user, the form is username@delphi com

Fidonet

To send mail to people using a Fidonet BBS, you need the name they use to log onto that system and its "node number " Fidonet node numbers or addresses consist of three numbers, in this form 1.322/190. The first number tells which of several broad geographic zones the BBS is in (1 represents the U S and Canada, 2 Europe and Israel, 3 Pacific Asia, 4 South America) The second number represents the BBS's network, while the final number is the BBS's "FidoNode" number in that network If your correspondent only gives you two numbers (for example, 322/190), it means the system is in zone 1

Now comes the tricky part You have to reverse the numbers and add to them the letters f, n and z (which stand for "FidoNode,""network," and "zone') For example, the address above would become

f190 n322 z1

Now add "fidonet org" at the end, to get
f190 n322 z1 fidonet org Then add "FirstName LastName@", to get

FirstName LastName@f190 n322 z1.fidonet org

Note the period between the first and last names Also, some countries now have their own Fidonet "backbone" systems, which might affect addressing   For example were the above address in Germany, you would end it with "fido de" instead of "fidonet org "

Whew!

The reverse process is totally different First, the person has to have access to his or her BBS's "net mail" area and know the Fidonet address of his or her local Fidonet/UUCP gateway (often their system operator will know it). Your Fidonet correspondent should address a net-mail message to UUCP (not your name) in the "to " field In the node-number field, they should type in the node number of the Fidonet/UUCP gateway (if the gateway system is in the same regional network as their system, they need only type the last number, for example, 390 instead of 322/390) Then, the first line of the message has to be your Internet address, followed by a blank line   After that, the person can write the message and send it

Because of the way Fidonet moves mail, it could take a day or two for a message to be delivered in either direction   Also, because many Fidonet systems are run as hobbies, it is considered good form to ask the gateway sysop's permission if you intend to pass large amounts of mail back and forth Messages of a commercial nature are strictly forbidden (even if it's something the other person asked for) Also, consider it very likely that somebody other than the recipient will read your messages

GEnie

To send mail to a GEnie user, add "@genie com" to the end of the GEnie user name, for example walt@genie com

MCIMail

To send mail to somebody with an MCIMail account, add "@mcimail com to the end of their name or numerical address For example

555-1212@mcimail com

or

jsmith@mcimail com

Note that if there is more than one MCIMail subscriber with that name, you will get a mail message back from MCI giving you their names and numerical addresses You'll then have to figure out which one you want and re-send the message

From MCI, a user would type

Your Name (EMS)

at the "To " prompt At the EMS prompt, he or she would type

internet

followed by your Net address at the "Mbx " prompt

Peacenet

To send mail to a Peacenet user, use this form

username@igc org

Peacenet subscribers can use your regular address to send you mail

Prodigy

UserID@prodigy com Note that Prodigy users must pay extra for Internet e-mail

SEVEN UNIX COMMANDS YOU CAN'T LIVE WITHOUT:

If you connect to the Net through a Unix system, eventually you'll have to come to terms with Unix For better or worse, most Unix systems do NOT shield you from their inner workings -- if you want to copy a Usenet posting to a file, for example, you'll have to use some Unix commands if you ever want to do anything with that file

Like MS-DOS, Unix is an operating system - it tells the computer how to do things. Now while Unix may have a reputation as being even more complex than MS-DOS, in most cases, a few basic, and simple, commands should be all you'll ever need

If your own computer uses MS-DOS or PC-DOS, the basic concepts will seem very familiar -- but watch out for the cd command, which works differently enough from the similarly named DOS command that it will drive you crazy Also, unlike MS-DOS, Unix is case sensitive -- if you type commands or directory names in the wrong case, you'll get an error message

If you're used to working on a Mac, you'll have to remember that Unix stores files in "directories" rather than "folders " Unix directories are organized like branches on a tree. At the bottom is the "root" directory, with sub-directories branching off that (and sub-directories in turn can have sub-directories) The Mac equivalent of a Unix sub-directory is a folder within another folder

cat Equivalent to the MS-DOS "type" command To pause a file every screen, type

```
cat file |more
```

where "file" is the name of the file you want to see Hitting control-C will stop the display Alternately, you could type

```
more file
```

to achieve the same result You can also use cat for writing or uploading text files to your name or home directory (similar to the MS-DOS "copy con" command) If you type

```
cat>test
```

you start a file called "test " You can either write something simple (no editing once you've finished a line and you have to hit return at the end of each line) or upload something into that file using your communications software's ASCII protocol) To close the file, hit control-D

cd The "change directory" command To change from your present directory to another, type

```
cd directory
```

and hit enter Unlike MS-DOS, which uses a \ to denote sub-directories (for example \stuff\text), Unix uses a / (for example /stuff/text) So to change from your present directory to the stuff/text sub-directory, you would type

```
cd stuff/text
```

and then hit enter As in MS-DOS, you do not need the first backslash if the subdirectory comes off the directory you're already in To move back up a directory tree, you would type

```
cd .
```

followed by enter Note the space between the cd and the two periods -- this is where MS-DOS users will really go nuts

cp Copies a file The syntax is

```
cp file1 file2
```

which would copy file1 to file2 (or overwrite file2 with file1)

ls This command, when followed by enter, tells you what's in the directory, similar to the DOS dir command, except in alphabetical order

```
ls | more
```

will stop the listing every 24 lines -- handy if there are a lot of things in the directory. The basic ls command does not list "hidden" files, such as the login file that controls how your system interacts with Unix. To see these files, type

```
ls -a      or    ls -a | more
```

ls -l will tell you the size of each file in bytes and tell you when each was created or modified.

mv Similar to the MS-DOS rename command.

```
mv file1 file2
```

will rename file1 as file2, The command can also be used to move files between directories

```
mv file1 News
```

would move file1 to your News directory.

rm Deletes a file Type

```
rm filename
```

and hit enter (but beware when you hit enter, it's gone for good).

WILDCARDS When searching for, copying or deleting files, you can use "wildcards" if you are not sure of the file's exact name

```
ls man*
```

would find the following files

manual, manual txt, man-o-man

Use a question mark when you're sure about all but one or two characters. For example,

```
ls man?
```

would find a file called mane, but not one called manual

WHEN THINGS GO WRONG

- You send a message but get back an ominous looking message from MAILER-DAEMON containing up to several dozen lines of computerese followed by your message

Somewhere in those lines you can often find a clue to what went wrong You might have made a mistake in spelling the e-mail address The site to which you're sending mail might have been down for maintenance or a problem You may have used the wrong "translation" for mail to a non-Internet network

- You call up your host system's text editor to write a message or reply to one and can't seem to get out

If it's emacs, try control-X, control-C (in other words, hit your control key and your X key at the same time, followed by control and C) If worse comes to worse, you can hang up

- In elm, you accidentally hit the D key for a message you want to save

Type the number of the message, hit enter and then U, which will "un-delete" the message This works only before you exit Elm; once you quit, the message is gone.

- You try to upload an ASCII message you've written on your own computer into a message you're preparing in Elm or Pine and you get a lot of left brackets, capital Ms, Ks and Ls and some funny-looking characters

Believe it or not, your message will actually wind up looking fine; all that garbage is temporary and reflects the problems some Unix text processors have with ASCII uploads But it will take much longer for your upload to finish One way to deal with this is to call up the simple mail program, which will not produce any weird characters when you upload a text file into a message Another way (which is better if your prepared message is a response to somebody's mail), is to create a text file on your host system with cat, for example,

```
cat>file
```

and then upload your text into that Then, in elm or pine, you can insert the message with a simple command (control-R in pine, for example), only this time you won't see all that extraneous stuff

* You haven't cleared out your Elm mailbox in awhile, and you accidentally hit "y" when you meant to hit "n" (or vice-versa) when exiting and now all your messages have disappeared. Look in your News directory (at the command line, type cd News) for a file called recieved Those are all your messages Unfortunately, there's no way to get them back into your Elm mailbox -- you'll have to download the file or read it online.

"E-mail someday will unite us all in a shared state of epistolary bliss E-mail is ethereal, it consumes no paper, no ink, and only a misting of fossil fuels E-mail is nearly instantaneous Best of all, e-mail combines the vacuity of phone talk with the potential permanence of letters A fledgling still, e-mail promises to burgeon beyond anyone's calculation. Maybe the letter's golden age isn't dead after all, it may be yet to come "An op-ed piece in the Nov 9, 1994 Wall Street Journal

"E-mail is reincarnating the age of letter writing We're keeping in touch the way the Victorians did, building a personal community connected by a constant stream of letters sharing news and gossip E-mail is reviving the 'letter' as a forum for wit, style, and personality, as well as serving as an invaluable business tool " Leslie Schroeder, Silicon Valley PR consultant to high- tech companies, from Computer underground Digest interview by David Batterson, Oct 1994

Introduction

In this chapter, you will meet your first Internet service - electronic mail Electronic mail (often abbreviated to email) allows for rapid communication between users without the problems associated with 'telephone tag' Email is probably the most used network application, and for many users is their primary application for the Internet Email is, of course, not restricted to the Internet Many organisations run their own in- house email systems, or use one of a range of private email providers In-house email systems include products like Microsoft Mail, CE's QuickMail, Lotus' cc mail Private email providers include MCImail, AT&T Mail, and Compuserve An increasing number of organisations are providing gateways from their in-house systems to the Internet, and most of the private providers provide such gateways These gateways enable users of in-house proprietary email systems to send and receive Internet email

Electronic mail is being covered in this section for a number of reasons
1 Email is a necessary tool to access a wide range of networked information
2 It is a core application of distributed networks
3 The people who can be contacted through email are as valid sources of networked information as automated systems

This last point is equally relevant to a range of other Internet tools and technologies which can all be considered under the heading of computer-mediated communication This includes email, network news, Internet Relay Chat, and Multi-User Dimensions

Working with email has many analogies to working with ordinary mail (sometimes derisively referred to as snail-mail by email devotees) In order to get a piece of mail from sender to receiver, a number of things have to happen

1 The sender has to create the mail
2 The sender consigns the mail to the mail system
3 The mail system has to get the mail to its destination
4 The receiver has to read the mail

With email, as in real life, step 3 is largely hidden from the user, and will be dealt with in the next section Steps 1, 2, and 4 depend for their detail on the email client being used, but a number of elements are always common

Writing the 'letter'

Most mail clients either come with a built-in message editor or allow the user to specify a system editor to use. In any case, a range of editing functions will be available, but without anything like the power of a word-processor. Depending on the editor, the functions may or may not include word-wrap. The message text will be limited to text only - no choice of fonts, styles (bold, italic, etc.), or variation in text size are possible. Often the editor will allow the user to include within the body of the mail message a text file that has already been created and saved to disk. This allows a user to create a file in their favourite word-processor, save it as text, and then include this text in the body of the email message.

As well, many mail clients allow the user to attach a file - as opposed to including it. The development of the Multipurpose Internet Mail Extensions (MIME) standard has enabled a range of other media types (graphics image, digitised movie, document, program file, etc.) to be attached to a normal email message. If the email client at the other end knows how to display the attachment, the user will be able to view it onscreen. Alternatively, the attachment can be saved to disk for further processing by another program. In this way, more complex documents can be transmitted via email. A typical use of this is to attach a formatted word processing file to an email message as an attachment. The receiver will then be able to open the attachment with their own word processor (assuming the sender and the receiver have used compatible word processing programs).

Addressing the 'envelope'

The address of the receiver must be specified (as well as the return address of the sender). Internet email addresses are always in the form user@host.domain. For example, my email address is aet@deakin.edu.au. This can be looked as consisting of two parts: the part to the left of the @ symbol which uniquely identifies an individual, and the part to the right which uniquely identifies a site. My unique identifier within Deakin university is aet. This is a property of the way Unix login ids are assigned within Deakin. Other organisations may use other methods to ensure uniqueness but anything to the left of the @ symbol must be unique within that domain.

Considering the material to the right of the @ in my address, there is only one Deakin University (deakin) within the educational domain (edu) in Australia (au). Thus the above email address, while compact, is guaranteed to be unique worldwide. The normal DNS conventions apply to everything to the right of the @ sign. The identifier to the left of the @ sign (aet in the example above) can either be a login id, or an alias. For example, Andrew Treloar could be (and has been) set up as an alias for aet. Depending on your mail client and whether you are using a non-Internet mail system, you may need to indicate that the address is for an Internet recipient. For example, IN%"aet@deakin.edu.au" is one mail system's way of indicating Internet addresses. In any case, the return address (for the sender) is usually generated automatically. Multiple receivers can also be listed, separated by commas.

Email includes additional information that is not normally part of a paper letter. The date and time of the email creation is automatically included. There is also a Subject field, for the sender to provide a brief description of the email contents. It is considered poor net etiquette (or 'netiquette') to leave this blank. In addition to the main receiver of the email it is also possible to Cc and Bcc the email to other people. Cc originally meant carbon copy - a delightfully anachronistic phrase from our communication past. Cc can be used to send the email to a number of other people in addition to the original recipient, but with the recipient being aware of this Bcc (blind carbon copy) sends a single message to multiple people without their knowing that it is also going to others

'Signing' the email

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"To talk in publick, to think in solitude, to read and to hear, to
inquire and to answer inquiries, is the business of a scholar"
Samuel Johnson, Chapter VII "The History of Rasselas, Prince of Abissinia"

A sample signature

Of course, it is not possible to sign a text-only message in the same way that snail-mail is signed Nevertheless, many people include an electronic 'signature' at the end of email messages. Such signature files typically include some contact information for the sender and often a witty/profound/funny/strange quotation that the sender finds appropriate Signatures longer than six lines are considered a breach of netiquette, but I like mine as it is It is becoming common to see WWW URLs in signature files as more and more people create homepages

Sending

Once the email is complete it can be dispatched into the email system Depending on the client it may be sent immediately, or queued up and sent off at intervals as part of a batch Batch sending may be more efficient if using a slower dial-up line.

Receiving

When email arrives, the receiver will usually initially only be shown the sender, the date and time of sending and the subject They can choose to open the email message and read it, to delete it, to save it, or to reply If they reply, the return address is filled in automatically, the subject being set by default to 'RE ' plus the original subject line

So far we have considered how email is created, addressed, and received, but not how it is moved from sender to receiver This is the task of Mail Transport Agents (MTA's) These are specialised pieces of software which take care of locating the address of the recipient and transferring the email to that address If an error occurs along the way (incorrect address, unable to get the email through) an automatic error message is returned to the sender As with any client-server system, protocols are essential Email systems draw on some selection of the following four protocols SMTP, POP, IMAP, and UUCP

The Simple Mail Transfer Protocol (SMTP) is initiated by the sender to deliver mail between Internet hosts with dedicated connections (the majority of Internet hosts) The sender in this case is the machine with mail to send, typically the machine running the mail client software used to prepare the email in the first place A number of attempts to send the mail will be made; if still unsuccessful, an error message will be returned The closest analogy to SMTP is the normal system of letterboxes and postal workers in the real world Mail is forwarded from post office to post office until it ends up in the right (usually!) mailbox

The Post Office Protocol (POP) is a store and forward protocol originally designed for delivery of mail to users who only make Internet connections at intervals Dialup IP connections are a good example The receiver connects to a machine running a POP server The POP server, which has already received the mail, then forwards it to the POP client run by the receiver In effect, the POP server acts like a Post Office (hence the name), holding the mail until the owner collects it

The Interactive Mail Access Protocol (IMAP) is a client-server protocol for the remote manipulation of mailboxes While not directly compatible with POP it works in much the same way Unix-to-Unix Copy Protocol (UUCP) was originally designed for communication over serial lines but has since been adapted to work over TCP/IP UUCP connections can be scheduled at regular intervals or initiated by either end UUCP is mostly used for delivery of mail for lots of users to dialup IP hosts The mail is then forwarded to individual users using either POP or IMAP In almost all cases, the type of Internet connection you are using will determine how you work with email For instance, if you are using a Unix shell account, you will probably be using a Unix mail client like mail, elm or pine The delivery program in this case will be *sendmail* using SMTP If you have a TCP/IP connection from your machine to the Internet you will probably be running a mail program like *Eudora* on your PC or Macintosh In this case the protocol for sending mail will be SMTP, with POP used to receive mail There may well be a range of possible mail clients for you to use - ask around (if possible) and see what others find most useful

Your email client will largely be determined by what your Internet provider supports If you are accessing the Internet through a Unix shell account, by far the easiest mail client for beginners is pine This is menu-driven and provides an excellent range of functions It also has a built-in message editor which supports word-wrap

If you are accessing the Internet through a direct connection to a LAN or via a dialup IP connection, the client of choice is Eudora from Qualcomm This is available for both Macintosh and Windows, and requires a TCP/IP stack (MacTCP for the Mac, Winsock-compliant for Windows) Eudora comes in both a public-domain version and a commercial version which provides some extra functionality The main advantage to the commercial version is that you can define rules to automate filtering of incoming email For instance, a user might specify that anything with the word 'contest' in the subject line would be automatically deleted, while anything from their superior would have its priority increased and be assigned the colour red to make it stand out Such filter rules will become increasingly important as the volume of email we all receive increases

Setting it up

Before you work with Eudora, you need to check the settings are correct Eudora has lots of settings, but the following at least need to be set correctly

1 POP Account

This is the account on the mail server that belongs to you This is where Eudora needs to go to get your email For me, on the Rusden campus, this is aet@mail-r deakin edu au

2 SMTP Server

This is where your outgoing mail will be sent On the Rusden campus, this is mail-r deakin edu au

3 Return address
This is the address people need to reply to send email to you For me this is aet@deakin edu au Of course, Andrew Treloar@deakin edu au will also work

You should also think about setting a signature file and a location for any received attachments to be placed

Composing and sending a message

Choose New Message from the Message menu The From line has automatically been filled in by the software based on the information you have told it Fill in the address of the recipient, the subject and the message text Attach a file if you want to When you are ready to send the message, click on the Send button

Reading a message

If the inbox is not open, select In from the Mailbox menu To open a mail message, double click on the line in the Inbox that contains its header information

Replying to a message

Choose Reply from the Message menu The recipient and subject will automatically be filled in The text of the original message will be prefixed with the > character You can then delete or refer back to the original message as you wish When you have finished click the Send button

Attaching files to email

Create a new email message Go to the Message menu and select Attach Document. Use the dialog box that appears to locate the file you want to send

Personal email

The primary use of email is, of course, to communicate with other people You will see an increasing number of people who provide email addresses in addition to their other contact information Many business cards now include email addresses - mine certainly does Email encourages a friendly style of interaction - many people are happy to receive and reply to email from people they have never met Of course, you should not abuse this openness Always ensure that you are approaching the most appropriate person Asking a genetics professor at another university for help with an undergraduate genetics assignment is not the sort of thing you would do in person - don't feel you can do it using email either You should get comfortable with using email - it can be a great benefit in your studies You may wish to use it to communicate with fellow students to coordinate group work or ask for assistance You should also get into the habit of using it to interact with your teachers Most people find email less intrusive than a telephone call, and with email you never have to play 'telephone tag', get a busy signal, or even answer Some proprietary email systems (like QuickMail or Microsoft Mail) allow the sender of an email message to receive an automatic reply when the receiver of their message reads it Internet mail has no such facility

Mailing lists

A number of different server programs provide for automated mailing lists A mail message sent to such a list is automatically redistributed to all the members of the list Such lists can be moderated (someone takes responsibility for vetting contributions and perhaps editing them) or unmoderated (no controls other than peer pressure apply). Mailing list software can also be used to distribute electronic journals In excess of 5,000 specialised lists exist to facilitate communication on a vast array of topics

Mailing list basics

In order to join a mailing list, you need to know the name of the list, and how to apply This last step can vary depending on the mailing list software used Typically, each mailing list has two email addresses the administrative address for things like subscribing/unsubscribing, listing users, turning off mail etc and the list address for messages that will be distributed to the other list members As an example, consider the INFOSYS electronic newsletter which uses the listserv software This list has an administrative address of listserv@american edu, and a list address of infosys@american edu To subscribe, I would send the message subscribe infosys Andrew Treloar to the administrative address listserv@american edu The listserver software is able to extract my return email address automatically - I do not need to include it in the message To contribute anything to the list, I would send it to infosys@american edu A common mistake is to send administrative commands to the list address This is annoying to other list members and brands you immediately as a 'clueless newbie'

Some mailing list software allows for automatic retrieval of information via email The user sends a message requesting a certain file and it is returned by email As an example, consider the Collins reference It was listed as Collins, Mauri P [1993], "Computer Networks and Networking A Primer", Interpersonal Computing and Technology, Vol 1, No 1, January To retrieve this file, send the following email message to listserv@guvm georgetown edu get collins ipctv1n1, This means that to retrieve this article from the electronic journal IPCT, you would send a message to listserv@guvm georgetown edu with the words get collins ipctv1n1 in the body of the email message

This sort of automatic distribution of files does not have to be associated with a mailing list As an example, the NetKnow Neophyte file is available via electronic mail directed to listserv software at Binghampton University in the United States This file provides an excellent overview of working with the Internet for new users Note that the case of what you type is usually irrelevant when working with mailing list software

Most mailing list software also allows you to get the names of all those who are subscribed, search archived messages, turn off mail during holidays, and receive the messages in digest form rather than individually

With literally thousands of mailing lists available, it is difficult to know where to start At least three ways are available

Published documents

A number of subject-specific Internet resource guides which you will be accessing in later chapters list mailing lists relevant to particular disciplines As you work with the Internet you will also see references to mailing lists that may be of interest to you

Lists of lists

If you are interested in seeing the rich diversity of lists you can get a list of all the listserv lists by sending the message list global to listserv@vm1 nodak edu You should be aware that the listserv software is not used by all mailing lists, so this will be an incomplete list Moreover, this email will contain information about some 5,000 lists so you will have a lot of information (over 300 K!) to sift through

Web searching

Another way of locating relevant mailing lists is through one of the many WWW search interfaces These let you search for text in the name of the list or the description of the list's topic area An excellent place to look is
http://galaxy.einet.net/galaxy/Business-and-Commerce/Management/Communications/How_to_Improve_Your_E_Mail.html

What is an e-mail

Electronic mail, or e-mail, is fast, easy and inexpensive connection to the world of the Net which consumes no paper and ink Millions of people around the world who use the Net have their own e-mail addresses You send mail to people at their particular addresses In turn, they write to you at your e-mail address

It is the most widely used Internet resource Just as a written letter can be sent to multiple recipients, an electronic mail message can be sent to one or more e-mail addresses You can also subscribe to the electronic equivalent of magazines and newspapers

A client program is used to read mail, reply to mail and send new messages Some examples of e-mail client programs are Lotus cc Mail, Microsoft Mail, GroupWise, Qualcomm Eudora, and Pegasus etc

Messages can contain text as well as other file types which are encoded and decoded by some scheme e g UUENCODE, MIME, BinHex etc

Understanding an E-mail address

An e-mail address identifies a person and the computer for purposes of exchanging electronic mail messages The address of the receiver must be specified (as well as the return address of the sender) The basic structure of an e-mail address is

username@host subdomain second-level-domain first-level-domain

In general, American addresses end in an organizational suffix, such as " edu," which means the site is at a college or university Other American suffixes include

com	for businesses
org	for non-profit organizations
gov and mil	for government and military agencies
net	for companies or organizations that run large networks

Sites in the rest of the world tend to use a two-letter code that represents their country Most make sense, such as in for India and ca for Canadian sites, but there are a couple of seemingly odd ones Swiss sites end in ch, while South African ones end in za Some U S sites have followed this international convention (such as well sf ca us)

For example, my e-mail address is "karups@teri ernet in" This can be looked as consisting of two parts the part to the left of the @symbol which uniquely identifies an individual, and the part to the right which uniquely identifies a site My unique identifier within TERI is karups Considering the material to the right of the @ in my address, teri is the host name, ernet is sub-domain and "in" is the domain name Thus the above e-mail address, while compact, is guaranteed to be unique worldwide.

How E-mail works

E-mail systems consists of two components a User Agent (UA) and a Mail Transport Agent (MTA) The UA is the user interface, where the user reads, writes, manipulates folders, etc The MTA, or "mailer", sends messages over the proper network, to the remote computer's MTA, ensuring reliable delivery The two MTA's use an e-mail network protocol to communicate with each other These are specialised pieces of software which take care of locating the address of the recipient and transferring the e-mail to that address If an error occurs along the way (incorrect address, unable to get the e-mail through) an automatic error message is returned to the sender As with any client-server system, protocols are essential E-mail systems draw on some selection of the following four protocols SMTP, POP, IMAP, and UUCP

The Simple Mail Transfer Protocol (SMTP) is initiated by the sender to deliver mail between Internet hosts with dedicated connections (the majority of Internet hosts) The sender in this case is the machine with mail to send, typically the machine running the mail client software used to prepare the e-mail in the first place A number of attempts to send the mail will be made, if still unsuccessful, an error message will be returned The closest analogy to SMTP is the normal system of letterboxes and postal workers in the real world ; Mail is forwarded from post office to post office until it ends up in the right (usually!) mailbox

The Post Office Protocol (POP) is a store and forward protocol originally designed for delivery of mail to users who only make Internet connections at intervals Dialup IP connections are a good example The receiver connects to a machine running a POP server The POP server, which has already received the mail, then forwards it to the POP client run by the receiver In effect, the POP server acts like a Post Office (hence the name), holding the mail until the owner collects it

The Interactive Mail Access Protocol (IMAP) is a client-server protocol for the remote manipulation of mailboxes While not directly compatible with POP it works in much the same way Unix-to-Unix Copy Protocol (UUCP) was originally designed for communication over serial lines but has since been adapted to work over TCP/IP UUCP connections can be scheduled at regular intervals or initiated by either end UUCP is mostly used for delivery of mail for lots of users to dialup IP hosts The mail is then forwarded to individual users using either POP or IMAP In almost all cases, the type of Internet connection you are using will determine how you work with e-mail For instance, if you are using a Unix shell account, you will probably be using a Unix mail client like *mail*, *elm* or *pine* The delivery program in this case will be *sendmail* using SMTP If you have a TCP/IP connection from your machine to the Internet you will probably be running a mail program like *Eudora* on your PC or Macintosh In this case the protocol for sending mail will be SMTP, with POP used to receive mail There may well be a range of possible mail clients for you to use - ask around (if possible) and see what others find most useful

Communicating to foreign E-mail systems

There are a number of computer networks that are not directly part of the Net, but which are now connected through "gateways" that allow the passing of e-mail Here's a list of some of the larger networks, how to send mail to them and how their users can send mail to you

America Online

Remove any spaces from a user's name and append "aol com," to get
user@aol com

America Online users who want to send mail to you need only put your Net address in the "to " field before composing a message

Bitnet

Users of Bitnet (and NetNorth in Canada and EARN in Europe) often have addresses in this form IZZY@INDVMS If you're lucky, all you'll have to do to mail to that address is add

"bitnet" at the end, to get izzy@indvms bitnet Sometimes, however, mail to such an address will bounce back to you, because Bitnet addresses do not always translate well into an Internet form If this happens, you can send mail through one of two Internet/Bitnet gateways First, change the @ in the address to a %, so that you get username%site bitnet Then add either @vm marist edu or @cunyvm cuny edu, so that, with the above example, you would get izzy%indyvms bitnet@vm marist edu or izzy%indvyvms bitnet@cunyvm cuny edu
Bitnet users have it a little easier They can usually send mail directly to your e-mail address without fooling around with it at all So send them your address and they should be OK

CompuServe

CompuServe users have numerical addresses in this form 73727,545 To send mail to a CompuServe user, change the comma to a period and add "@compuserve com", for example
73727 545@compuserve com
Note that some CompuServe users must pay extra to receive mail from the Internet
If you know CompuServe users who want to send you mail, tell them to GO MAIL and create a mail message In the address area, instead of typing in a CompuServe number, have them type your address in this form

>INTERNET YourID@YourAddress

For example, >INTERNET adamg@world std com Note that both the ">" and the " " are required

Delphi

To send mail to a Delphi user, the form is username@delphi com

MCIMail

To send mail to somebody with an MCIMail account, add "@mcimail com to the end of their name or numerical address For example
555-1212@mcimail com
or jsmith@mcimail com
Note that if there is more than one MCIMail subscriber with that name, you will get a mail message back from MCI giving you their names and numerical addresses You'll then have to figure out which one you want and re-send the message

From MCI, a user would type
Your Name (EMS)
at the "To " prompt At the EMS prompt, he or she would type
internet
followed by your Net address at the "Mbx " prompt

Utilities for encoding and decoding mails

An electronic mail system can not transmit binary (non-printable codes) data but it is not limited to text file only Other types of files can be added to mail messages as attachments Attachments can be binary files such as a word processed document, a spreadsheet or a graphic image

There exists several encoding schemes by which a binary file can encoded to a text file and a encoded text file can be decoded to the original file If an attached file is not encoded, the E-mail software encodes the file using its default encoding scheme Each encoder inserts a unique identification tag at the beginning and the end of the encoded message The encoded file may be incomplete if the end mark in the encoded file is missing To encode a file, save the attachment in a file and remove the message part if exists Use the same scheme which is used for encoding

Some famous encoding/decoding schemes

1 MIME /UNMIME
2 UUENCODE/UUDECODE
3 BinHex/BinHex
4 ATOB/BTOA

Indian E-mail service providers

1 VSNL GIAS
2 Axcess Online Services
3 Sprint RPG India Limited
4 Datapro Information Technology Limited
5 Global Telecom Services
6 WiproBT
7 Department of Electronics

E-mail Services In India

PCQ Labs reviews five major e-mail providers

For this review, PCQ Labs set up test accounts at Bangalore, Delhi and Mumbai Vendors were also requested to activate a roaming account at Pune Vendors were allowed to install the necessary software on our test machine, and configure it. The only difference was VSNL GIAS, where we used Telix—a popular shareware app—as no specialized software was provided Once the software was properly set up, the tests began on an 'as-is where-is' basis We were unable to review VSNL's GEMS 400 service, as test accounts were only available at two locations—Delhi and Mumbai

E-mail usage can broadly be classified into two levels—corporate and person to person—of messaging In the former, most of the data sent and received is information such as MIS, sales and purchase reports And as our test of the market showed, most corporate messaging in India uses the same service provider, with all branches and users connected to the same system Corporate messaging also uses value-added options such as message confirmation and faxing On the other hand, person-to-person messaging is not restricted to a single provider, and is usually across systems

To send e-mail, a user has to first prepare the message, and then dial in to the provider's nearest node to send or receive mail The software provided helps the user manage messages And the service provider needs to ensure that e-mail sent reaches its destination at soon as possible, without losing content or importance

In this review, we have checked each of these stages Service and support was tested in some detail. It has not been included in the rankings, as we were unable to duplicate test conditions with every vendor Security of the system and mail has not been tested

Test messages were exchanged from Delhi and Bangalore to the other test account at Delhi, Bangalore and Mumbai, at predetermined times And all locations were checked (in alphabetic order) at hourly intervals for mail receipt

To connect to a node, we tried two alternate numbers, five times each. If a connection was not established, we proceeded to the next service, and only returned the busy ones at the end of the cycle

To test the supplied software's ability to handle attachments, a standard attachment consisting of a BMP file embedded in a Word document was used

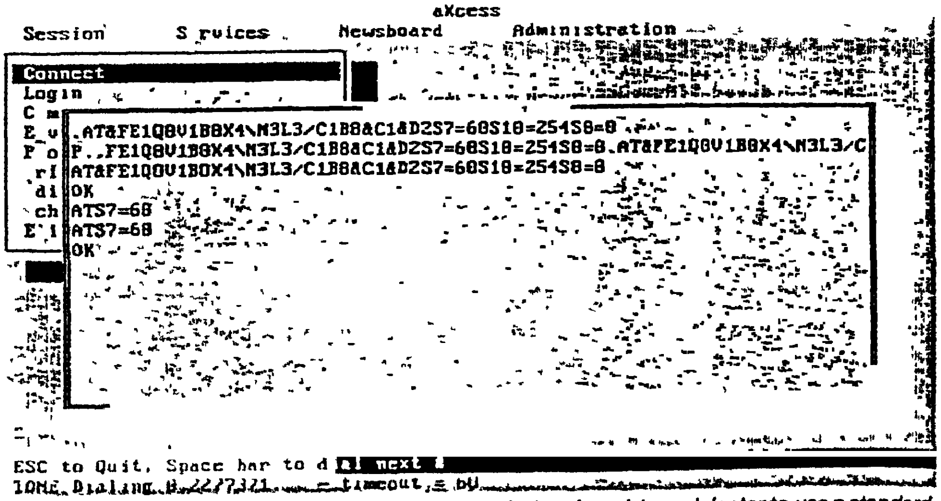
aXcess

aXcess Electronic Messaging is a DOS based e-mail service. And it's initial splash screen is the only graphical element aXcess gives you the option of using either their software, or any standard communications app (such as Telix) to upload and receive mail

With aXcess you can prepare messages both on and offline However, features such as the Address book and Alias lists can only be created and accessed while online Therefore even though you create messages offline you still have to remember the e-mail address or at the very least the recipient's e-mail alias (nickname for the full address) Using this method, an address such as labsd.pcq@axcess.net in becomes 'labsdelhi' which is easier to remember

The problem with remembering multiple aliases or addresses is mitigated a bit by Alias lists that allow to you club e-mail addresses under an easy to remember word such as 'Friends'

Once you dial in, aXcess allows you to organize your mail by moving and copying messages between folders You can view or create messages using the built-in editor which looks a lot like WordStar 4. And the pull-down menus are quite straightforward But using the e-mail software would have much easier with dialog boxes instead of the nested sub-menus approach used You have to select 'Move' to choose the message to



```
.AT&FE1Q0V1B0X4\N3L3/C1B8&C1&D2S7=60S10=254S8=0
F..FE1Q0V1B0X4\N3L3/C1B8&C1&D2S7=60S10=254S8=0.AT&FE1Q0V1B0X4\N3L3/C
AT&FE1Q0V1B0X4\N3L3/C1B8&C1&D2S7=60S10=254S8=0
OK
ATS7=60
ATS7=60
OK
```

```
ESC to Quit, Space bar to d    next
IONE Dialing 2227321   timeout
```

The aXcess DOS interface packs quite a few options, but we found it much faster to use a standard PC comms app and work from the command line move, then select the target folder to move to, and finally press <Esc> to back out

One problem we faced with aXcess was that you can't address a message to more than seven people in the To list And the same restriction also applies to Alias lists To make it harder, the system has few prompts and messages There is no way of knowing when you are done with the current chore And you end up staring at the screen wondering what's going on A simple dialog box mentioning that the task is completed would be nice

aXcess also gives you access to Business India's database of the Stock Market and Foreign Exchange rates But when we tried to check this, we got an error message that we weren't registered for this service

At all test locations, we had problems connecting to the aXcess nodes

E-mail Costs: A Comparison

Vendor	Sign-on charges	Unit	Internet Mail	Inter-system	Same system	Fax (India) *	Fax (Overseas)
Axcess	Rs 2,700	1 KB	Rs 6	Rs 6	Rs 1	NA	NA
Datapro Xee MAIL	Rs 10,000	2 5 KB	Rs 4	Rs 4	Free	Rs 5 20	Rs 50
Global ISOPRO	Rs 7,700	2 5 KB	Rs 4	Rs 4	Rs 1	Rs 12 .20	Rs 50
VSNL GIAS Shell	Rs 5,500	Nil	Free	Free	Free	NA	NA**
VSNL GIAS TCP/IP	Rs 16,500	Nil	Free	Free	Free	NA	NA**
Sprint RPG	Rs 8,200	2 5 KB	Rs 18	Rs 6	Rs 3	Rs 15 23	Rs 83
Wipto BT	Rs 4,500	2.5 KB	Rs 4	Rs 17	Rs 2	Rs 10 20	NA

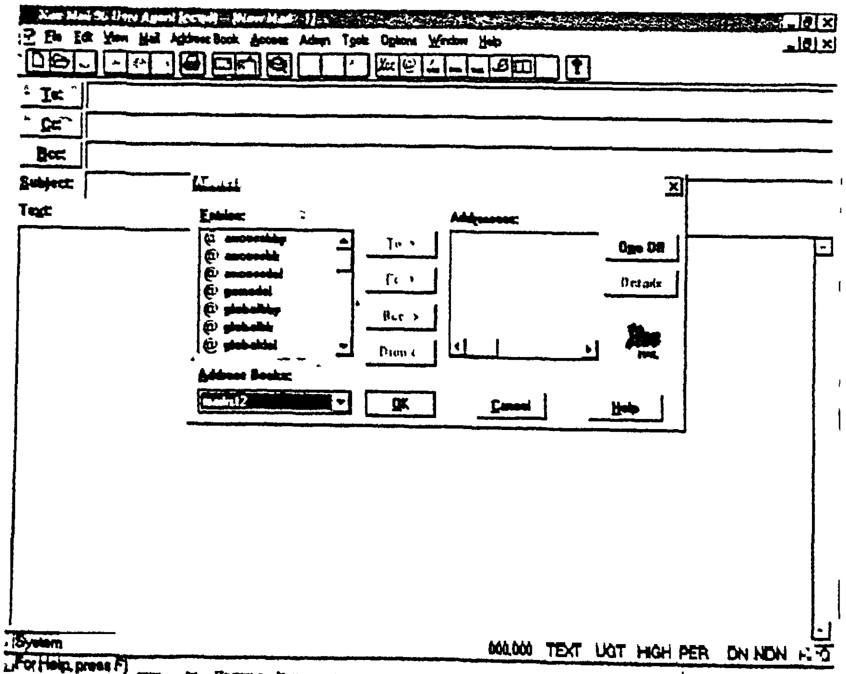
*NB: *City with node (using network)/city without node (using dialup STD lines),*
***Available as an Internet service (see Faxes For Free in this issue)*

Datapro Xee-MAIL 96

The Xee-MAIL 96 user agent is an easy-to-use app whose other options besides e-mail include printing, managing address books, access permissions, administration, tools, and a neatly compiled help file

During installation, the software by default creates a System Administrator (Sysadmin) This user has the rights to add five more users and define their access rights

Creating e-mail is the same as with other Windows-based e-mail apps. You create new mail by typing in a message, or by using cut- or copy-and-paste from other messages or text documents, and by using attachments One nice feature about the latter is that you don't have to specifically invoke the address book Just click the To tab, and the address book displays automatically Next double click on the recipient's alias and the address is entered in the To field However, Xee-MAIL does have a strange way of connecting to the node After preparing your messages, you have to restart in DOS to dial-in For a Windows app, its really strange that you need DOS for such simple tasks



Xee Mail's Windows front-end lets you create messages, though you go to DOS to dial up, and send and receive mail

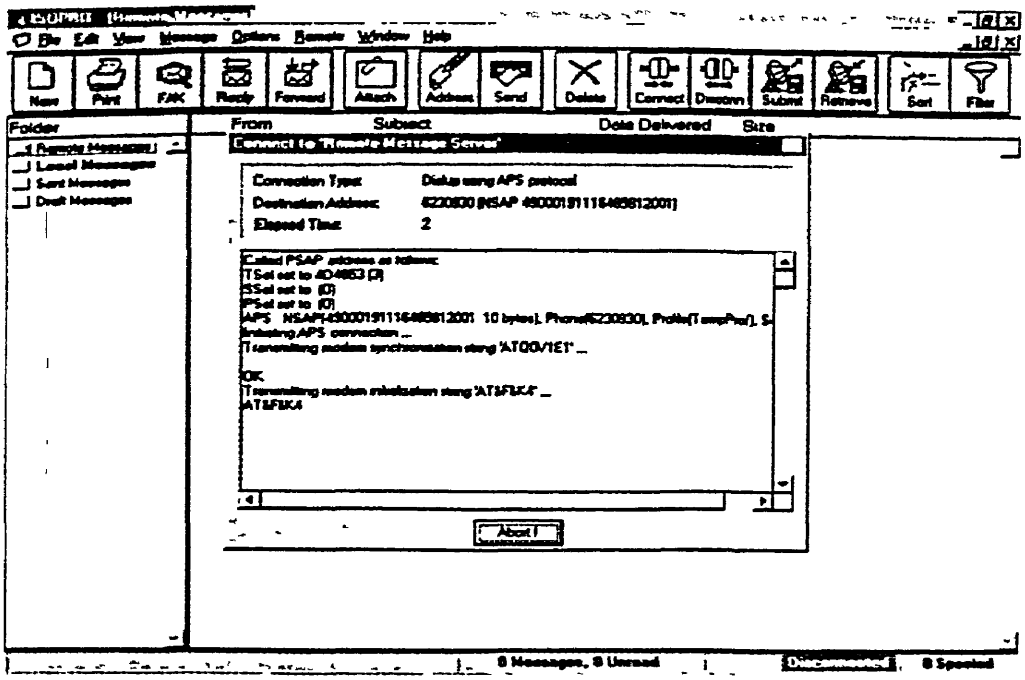
One area where we faced problems was while using mailing lists The package refused to queue a mailing list, and this remained consistent, regardless of whether the mailing list consisted of a single address or of 20 addresses We even checked if the Sysadmin had imposed any such restrictions on the user, but found none And even the Sysadmin was unable to queue the mailing list for dispatch

Creating an address book is simple There are several templates for adding a new e-mail address There are also additional features such as authorizing access to someone else to use your account while you are away and encoding a message for privacy

Connecting to Datapro's nodes was fairly easy at all locations We were usually able to connect in three tries. And in the worst case, it took eight attempts to get through at 11 00 AM in Delhi But in Bangalore we faced a problem After a full day of testing, our mail box the next day was full of 172 undelivered messages Many of these were duplicates, and others had been sent and received by recipient However this problem occurred only once

Global Mail

This is an easy-to-use e-mail app. You read your mail and create new mail offline Once



Connection Type: Dialup using APS protocol

Elapsed Time: 2

Global's software (upgraded three times during our review) is easy to use but for its addressing, and automates most tasks

everything is ready, you just connect to the node Mail received is downloaded and whatever you have ready in your Outbox is uploaded for onward transmission And once connected, the software graphically displays messages being retrieved

All the retrieved mail is automatically stored in the local folder A really nice thing about this package is that unread mail has a sealed envelope icon and mail read has an open letter icon This helps you distinguish between new messages and old ones Activities such as connecting to the node and sending and receiving mail have been simplified And can be done through one click of your mouse

However, creating Address Books is really painful as there are no templates If you want to enter an Internet e-mail address, instead of using the common @ symbol you have to enter '(a)' The window to make this entry is quite confusing and consists of several tabs that ask just about everything but the way to grandma's house The main tab lets you fill in details such as your given name, surname, common name, and primary routing details Then there's a network tab where you enter the domain defined attributes and other network details needed for Internet addresses There's also a postal tab to enter details such as a person's postal address and telephone numbers There's the Others tab to enter the alias name And finally there's the X 500 tab with several of its own queries It would have been much simpler if templates had been provided,

How Helpful Are Help Desks?

India has never been known for after sales support or service—be it from public utilities or computer vendors And e-mail, which falls somewhere in between, is no exception The story (and service) is more or less identical, whether its public sector VSNL—which has been strongly criticized—or private service providers who are expected to be better, yet who too are the same

Usually, when you call the Help Desk in an emergency—this in itself an indicator that something has gone wrong—you are fully justified in expecting an immediate solution to your problems Instead, the assigned telephone numbers are either busy or go unanswered. And when they are answered, more often than not no technical staff is available to properly respond to your queries Or to fix the problem.

In the course of this review, our experiences with the various service providers did not impress us (And remember as PCQ Labs reviewers, we were in a sense handicapped, as we invariably had to disclose our e-mail addresses—and identities—when calling the various help desks) Incidentally, almost all our calls were related to problems we actually faced, including non-working software, nodes that refused to respond, junk being attached to messages, and so on

aXcess began the cycle by not giving their front-end software in Delhi. And what was finally delivered did not have a single installable module Getting connected to their help desk was virtually impossible (in Delhi) during the day.

Sprint RPG claims to operate a 24-hour help desk in Delhi. Yet when we called up at night, the telephone rang unanswered. However, during working hours things were better.

Datapro had several problems while installing their software on our test machine in Delhi And could successfully complete it only after multiple attempts And then they gave up trying to (fruitlessly) install value-added additions because of inherent bugs in the software

Global's help desk was initially very difficult to get through to. They subsequently set up a 24-hour help desk in Delhi, which despite its name apparently does not function after office hours (presumably 9-to-5)

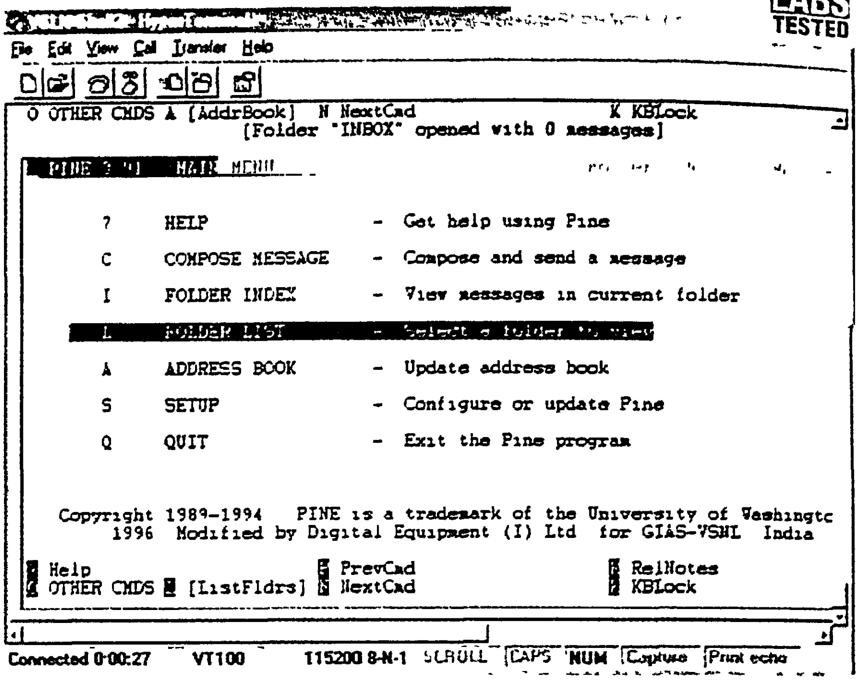
Wipro BT help desk was a waste of time They were unable to help set things right most of the time because "no one was available."

In comparison, and despite criticism, VSNL's help desk seems a much more organized operation Particularly when you begin with low expectations, and are willing to wait while they connect you.

as in Sprint mail

A really helpful feature about this app is that if there's pending mail in the Sent Mail folder the software prompts you on whether to send it or not whenever you exit Sending or receiving attachments is easy between two ISOPRO users We sent a ZIPfile between two ISOPRO hosts, and between an ISOPRO and another e-mail package Between the former, the attachment format was recognized, but in the latter the file changed to BIN format This necessitated a call to the Help Desk for a solution. Just save the BIN attachment as a ZIP file and then access it

Connecting to Global was not a problem We were able to get through on the first try itself on most occasions And the worst case was five tries that happened twice at Bangalore in the afternoon


File Edit View Call Transfer Help
Connected 0:00:27 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

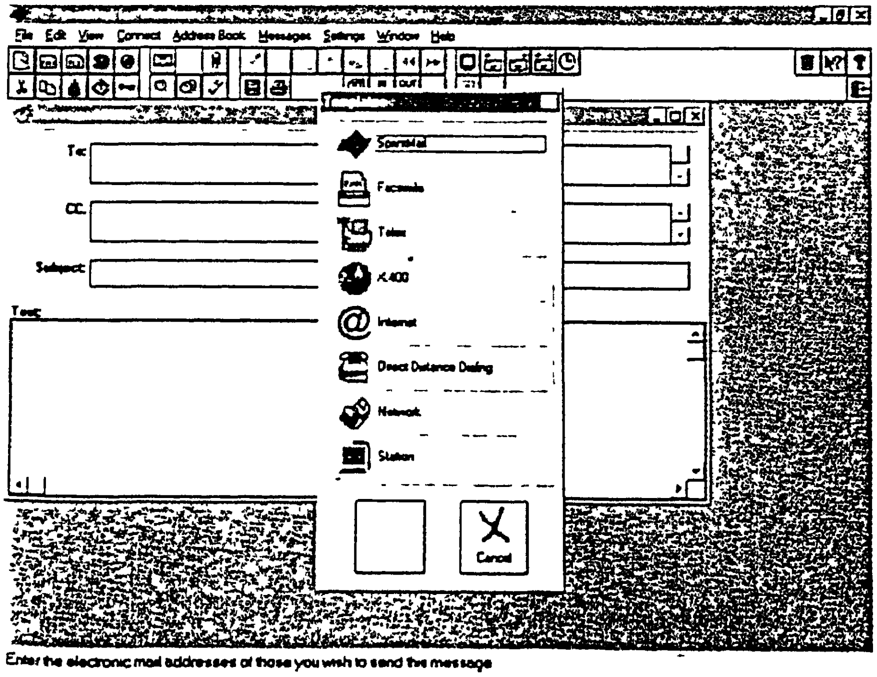
```
 O OTHER CMDS A [AddrBook]  N NextCmd                    K KBLock
                  [Folder "INBOX" opened with 0 messages]

  PINE 3.91   MAIN MENU

        ?     HELP                 -  Get help using Pine

        C     COMPOSE MESSAGE      -  Compose and send a message

        I     FOLDER INDEX         -  View messages in current folder

        L     FOLDER LIST          -  Select a folder to view

        A     ADDRESS BOOK         -  Update address book

        S     SETUP                -  Configure or update Pine

        Q     QUIT                 -  Exit the Pine program


    Copyright 1989-1994   PINE is a trademark of the University of Washingtc
         1996  Modified by Digital Equipment (I) Ltd  for GIAS-VSNL  India

 ? Help                       P PrevCmd                   R RelNotes
 O OTHER CMDS L [ListFldrs]   N NextCmd                   K KBLock
```

VSNL's GIAS uses Pine, which you access through any comms program. But you can use Eudora or other Windows mail clients that handle dial-up shell accounts

Sprint RPG

The SprintMail software is by far the most option-filled e-mail app It seems to have a button for just about any task And apart from the normal send and receive mail options, there's also an interactive option that allows you to log on to the node and work online You can also join several edutainment forums available on SprintMail These range from astrological predictions to technical discussions

All tasks from message composition through address book management to interacting with the host are performed by clicking icons on the toolbar However as is usual with such an impressive number of buttons, initially it can be quite confusing to decide which one does what Tool tips or an Icon explanation screen would definitely add to the ease of use



Enter the electronic mail addresses of those you wish to send the message

PC SprintMail for Windows is rather intuitive, and icons reduce many tasks to one click, while templates make addressing easier

There's also an option to set up and perform scheduled operations This allows you to send mail at a preset time, or check for mail

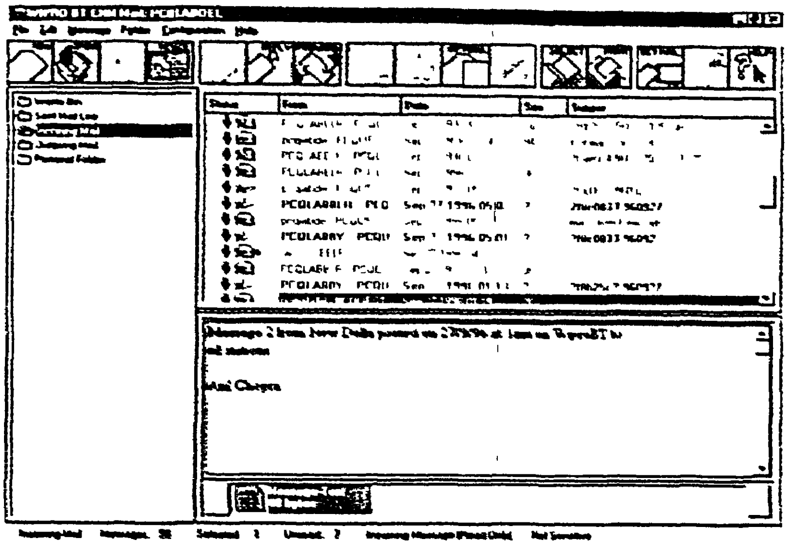
Managing address books too is simple There is a range of templates that convert the address into Sprint's format When SprintMail first started in India, the Internet template would not work properly, as it had not been customized to Indian addressing But this bug has since been fixed, and Internet addressing too is supported by the templates

Connecting to Sprint was also easy with at worst, a second try required

VSNL GIAS

GIAS offers two types of accounts—shell and TCP/IP E-mail is available in both through a shell account As GIAS is essentially an Internet service, in this review we have considered only the shell account And more specifically only its e-mail section

GIAS uses a vanilla interface with no special software, and you can any standard communications app to connect The account is customisable in the sense that you can use specialised third party app such as Eudora, or



Wipro BT's elegant Windows front makes organising your mail easy

browsers like Microsoft's Internet Explorer if you choose the TCP/IP account to simplify sending and receiving mail

On the whole we found the GIAS shell account a little tough to use For one thing, other packages had easy menu-driven options for uploading and downloading files for attachments, and for creating messages offline And VSNL has disabled the GIAS menu options for upload and download

Selecting upload gives a message asking you to go to the restricted UNIX prompt and use rz for uploads However, if you do so and start the upload process using your comms app (we used Telix) it transmits for a while before crashing To upload files you need to use the additional switch -be (rz -be <filename>)

Similarly, the download option tells you to use sz, but to download your mail in one go we had to use additional switches again (sz -e -l 1024 -L 1024 <filename>) to get mail and attachments together And attachments are MIME encoded, so you need a program such as XFERPRO (PCQ Summer '96 CD-ROM) to convert them into a readable format Alternately you can save attachments to your local directory on VSNL server, and then download them separately

You can also read your mail online in PINE, the shell account's e-mail package with a built-in address book However, PINE doesn't let you queue messages to send them later You must send, cancel or postpone You can also upload ASCII text directly into PINE which works for short messages However, when we tried uploading a UUENCODED attachment, the system went into an infinite loop and eventually disconnected after more than five minutes of endless screen scrolling

Connecting is comparatively difficult with GIAS At all stations, we had to keep re-dialling to get connected This happened on almost all attempts

On the other hand, VSNL GIAS doesn't charge you per message or on a volume basis—a powerful attraction especially if you are sending and receiving a lot of mail And more importantly, you get Internet access—something none of the other services reviewed can offer today There's only a one-time (renewable) connect charge for every 500 hours of use

Wipro BT EXM Mail

Wipro BT EXM Mail—to give it its full name—is based on the EXM/UA interface. And includes the primary interface to the local user, a communication server, and a configuration utility The communications server is a program that handles all communications with the message store The server/node that you log on to is the message store

Your mail will be transferred to your Inbox The message store notifies where the message has come from, whether it's a message delivery report, or a message with an attachment And all details are specified including the date, time of delivery, status, subject, and its origin

Mail sent can be assigned different priorities, importance, and sensitivity levels They can be directly typed in or sent as an attachment You can also create an address book where each entry has an alias

Mails for despatch is stored in the outgoing mail folder, and whenever you connect to the message store, it will be transmitted Automatic connection to the message store occurs as soon as you log in One problem encountered with this package was that in most of the mail we sent, an extra part was created by the software Sometimes this add-on was sent as an attachment

At Delhi and Bangalore, we were able to connect to the node on the first try, or at worst, on the second However, connects in Mumbai were bad with most requiring five or more tries

Krishna Kumar and Anil Chopra (Delhi), Prasanth L Rao (Bangalore) and Jamsheed Gandhi and Gopkiran Rao (Mumbai)

Users Guide To Email Service Providers

Axcess Online Services
B3/86 Safdarjung Enclave
New Delhi 110029
Help Desk 11-6183225, 6183223, 6183181

Sprint RPG India Limited
Gulmohar House,
161/B-4, Gautam Nagar, Yusuf Sarai
New Delhi 110049
Help Desk 11-6862562 (24-hours)

Datapro Information Technology Limited
Keltron Chambers
18-7/8, Arya Samaj Road
New Delhi 110 005
Help Desk 11-5753641, 5728051

Global Telecom Services
C-47, N D S E Part-II
New Delhi 110049
Help Desk 11-6230221

WiproBT
E-13, Greenpark Main
New Delhi 110016
Help Desk 11-509 2597

VSNL GIAS
Videsh Sanchar Bhawan
Bangla Sahib Road
New Delhi 110 001
Help Desk 11-3747310, 3361111

BNLDAG Email Note 1

Email Systems

r imossi, x3948, imossi@bnldag ags bnl gov (10/11/95)

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1.0 Introduction

Electronic mail is the most frequently used computer application.

Email systems are abundant and rapidly changing with many confusing choices Different email systems do not interface with each other Because of Internet's wide acceptance, Internet email standards are providing models and directions to the field

1.1 Email Systems

Email systems consists of two components· a User Agent (UA) and a Mail Transport Agent (MTA) The UA is the user interface, where the user reads, writes, manipulates folders, etc The MTA, or "mailer", sends messages over the proper network, to the remote computer's MTA, ensuring reliable delivery The two MTA's use an email network protocol to communicate with each other

```
                                   network
user2<---UA<---MTA<------------------------------MTA<---<---UA<---user1
```

The UA and MTA are usually two separate programs on a computer There can be many UAs on a computer, allowing a user to choose his favorite interface, may it be a text-based, graphical, X-windows based, etc. They all use the same MTA

1.2 Email Networks

Email systems use networks to send messages over Internet's TCP/IP is the world's most popular Wide Area Network (WAN) and is quickly becoming the nation's most popular

Local Area Network (LAN)

1.2.1 Internet wins as the Wide Area Network

There are many Wide Area Networks to choose from, (Internet, Bitnet, DECnet, UUCP, OSI) but the market place has overwhelmingly decided on the Internet. The Internet (also known as TCP/IP or The Information Superhighway) ties together the largest global electronic mail community

1.2.2 Other networks lose as the Wide Area Network

Bitnet mail is dying Every month a new Bitnet node table update is distributed with the number of Bitnet nodes always less than the previous month's

DECnet mail is limited to DEC computers, which normally have an Internet connection anyway, making DECnet redundant

UUCP mail has been replaced by Internet mail on Unix computers

Eventhough, the Open Systems Interconnect (OSI) network is the international standard network, supported by governments, and developed as long as Internet, it is languishing, Internet was developed bottom-up, its protocols work, whereas, OSI protocols are top-down, and difficult to implement

1.2.3 Internet wins as the Local Area Network too

Local Area Networks are alive and well, especially for PCs PC LAN email programs use all these networks transparently, so the user need not worry which one his PC is using There are many varieties of PC LAN networks such as Microsoft Windows Network, Novell Netware, Banyan VINES and, of course, Internet's TCP/IP Here again, an Internet standard is becoming dominant LAN traffic according to Client/Server Today (1/95) shows TCP/IP to be on top by 1996

	1994	1996
Internet TCP/IP	29%	43%
Novell Netware	42%	35%
DECnet	6%	4%
OSI	1%	0%

1.3 Internet Email System (SMTP and MIME)

On Internet, the MTA uses a mail transfer protocol called SMTP (Simple Mail Transfer Protocol) It transfers a message, between computers, over any network, reliably and efficiently

The SMTP message format is a simple format, consisting of short lines of 7-bit ASCII characters--no binary here

A new Internet message format, called MIME (Multipurpose Internet Mail Extensions), is replacing the SMTP message format MIME makes it possible to send PostScript, video, audio, images, binary files, spread sheets, word processing documents, executable programs, etc , as attachments to a message MIME messages are transferred with the same SMTP network protocol as SMTP messages MIME messages have binary data text encoded, usually using BASE64 Headers in the MIME message describe the different types of message data so the remote mail system can interpret, decode and present the message. The beauty of MIME messages is that they are sent over the network with the same SMTP MTAs that presently exist for the old SMTP message format messages So all the SMTP MTAs in the world are unchanged, only the UAs must be enhanced to handle MIME .

MIME message definition is so popular that it becoming a standard beyond email The World Wide Web is based on MIME formats Usenet is implementing it. The PC software developers are supporting MIME within their proprietary email systems Microsoft is planning to support MIME in their new messaging products, Lotus has released MIME-capable SMTP software, Novell/WordPerfect are expected to support MIME.

1.4 SMTP/MIME vs X.400

International standards are published jointly by the International Standards Organization (ISO) and the International Telecommunications Union (the ITU, formerly CCITT)

There is an international standard MTA called X.400, which is the only MTA that gives Internet's SMTP competition However, X.400, popular only in Europe and Canada, is rare in UNIX environments because SMTP (the notorious Sendmail program) is bundled with UNIX Also X 400 defines a message format that is deficient compared to Internet's MIME message format X 400 is so complex, no two implementations agree. It's addresses are hard to remember It can use the Internet as it's network, but doesn't, using the OSI network, leaving SMTP alone on the largest network in the world

2.0 Current Email Systems

There are three popular email systems today Two dominated by Internet email standards The other is dominated by the PC software developers, each defining their own unique PC-LAN proprietary-based standards.

- host-based email - users and mail boxes are on the same mainframe/minicomputer
- PC LAN email - users remotely access a simple post office file from their PCs using proprietary, vender-specific, protocols
- Client/server email - users remotely access a email server computer from their PC/workstations using network protocols Client/server is a subset of distributed computing

A mail box is a file or data base where a user gets mail. A post office is a group of mailboxes.

2.1 Host-based Email

This is the traditional email system The UA and MTA are both on the same computer. The computer can be a timed-shared system or a single-user workstation.

The computer must be connected to Internet Other WAN email network connections like DECnet, Bitnet and UUCP, are useful but getting less important and will disappear.

Users connect to the host-based computer with terminals, terminal-emulators and X-terminal sessions

```
           SMTP
Internet<--------Time-shared<---------term/Xterm/PC/MAC/UNIX<------User
                   computer
                  (UA & MTA)
```

2.2 PC LAN Email

A typical PC email LAN email consists of a shared network file (post office) and a group of PC's A user sends mail by directly depositing the message into a file. Sender and receiver both access the file This is a simple mail system, no MTA, just an UA and a file Expensive point-to-point gateways are used here to get to Internet or other proprietary PC email systems Popular PC LAN email are MicroSoft Mail, Lotus cc Mail, Novell MHS and Novell/WordPerfect GroupWise email

```
                            PROPRIETARY
PC Mail<------------------------------------------------------PCs<--Users
File                                                          (UA)
```

A PC LAN email package is fully integrated into the vender's suite of office programs such as word processor, spreedsheet, presentation graphics, etc You get work group capabilities not available from other email, such as custom message forms, group scheduling, work flow, EDI etc There are disadvantages

Scalability of PC LAN email is limited to small groups of users (workgroups) Centrally managing workgroups is difficult Managing gets more complex as the number of post offices, mail gateways, workgroups and users increase All these systems run on PCs which are not good servers

Since the PC LAN software is proprietary, none of the PC LAN packages communicate with each other or the outside world of Internet (SMTP/MINE) unless through another gateway PC The PC email developers do not make good PC gateways and the gateways are expensive

The MicroSoft Mail SMTP gateway can handle only one connection at a time, only a few messages per connection, and is unavailable for a period of time after each connection (10's of seconds) It doesn't support MIME, just SMTP It requires a PC dedicated to running just the SMTP gateway Sites report the MS Mail SMTP gateway not reliable or robust

Some PC LAN systems allow other platform besides PC's, for example, Lotus cc mail runs on Windows, DOS, Macintosh, O/S and Unix But, on the whole, this is not a robust system for widely distributed email system

2.3 Client/Server Email Model

The mailbox and MTA reside on a server computer, and the user interface (UA) resides on a client computer The client and server communicate with a special network protocol Internet standards (POP/IMAP) dominate this field PC developers are trying hard with their proprietary standards

Do not confuse client/server with PC LAN email Both have the UA on a client computer, but PC LAN email has no true server, but merely a simple, shared file system

2.3.1 Internet POP/IMAP Client/Server Email Model

This is the Internet model for client-server email The client and server communicate with each other over Internet using either the POP (Post Office Protocol) or IMAP (Internet Message Access Protocol) protocols POP is being replaced by the newer IMAP POP and IMAP both allow access to mail on a remote server from a variety of different client platforms, such as PCs, Macs, Unix and workstations Mail is delivered to an "always up" mail server

```
              SMTP                      POP/IMAP
Internet<----------Mailbox<-----------------PC/MAC/UNIX<--------User
                   Computer                 Client
                     (MTA)                   (UA)
```

There are two versions of POP, POP2 and POP3 POP3 is better than POP2, but IMAP is the best IMAP2 is the current version of IMAP but IMAP4 is coming fast. IMAP is a functional superset of POP, so try to get an email client that uses IMAP Currently POP3 is the most widely available today Whether you choose POP or IMAP, make sure the client supports MIME messages

POP only allows access to your new mail folder A POP client downloads all pending new mail into the client computer Thereafter, all mail is processed on the client computer POP works best for those using only one client computer

IMAP leaves mail on the server, however, it can be made to download all new mail just like POP An IMAP client program can access ALL email folders on an IMAP server as if they were local Messages reside on the server until the client explicitly moves or deletes them. Messages and attachments can be extracted from the server onto the client computer and viser-verse IMAP works best for those using many client computers This means if you have a Mac in your office, and PC at home, and a Unix machine in the lab, you can move freely among them and access the same mailbox If you are on your PC and get mail with a binary attachment of an SGI unix execution file, you log out and get onto you SGI, read mail and extract the file onto your SGI

A list of commercial and free IMAP email clients can be obtained by sending email to mailserv@innosoft com with the one line text

```
send imap software
```

A list of commercial and free POP and IMAP email clients can be obtained by sending email to mailserv@innosoft com with the one line text

```
send mail_clients.txt
```

2.3.2 PC Client/Server Email Model

The PC software developers have their own client/server email models Microsoft MAPI, Lotus VIM, and even XAPI's CMC(Common Mail Calls) Microsoft MAPI is the most popular but independent PC developers feel it is functionally deficient and that Microsoft is not revealing all details of the standard

3.0 BNLDAG Supports All Current Email Systems

3.1 BNLDAG As A Host-Based Email System

Currently, the BNLDAG user has three choices of user agents VMS Mail, PMDF Mail and PINE Note, a graphical email user interface will soon be available It will be drop-n-drag, MIME compliant, X-windows compliant and a World-Wide-Web browser (netscape/mosaic replacement)

VMS Mail (executed with the MAIL command) is woefully obsolete and will never support MIME

We suggest all users on BNLDAG, use PMDF Mail (executed with the EMAIL command) which is a superset of VMS Mail PMDF Mail supports MIME and has many great features, including the elimination of the annoying IN%" handle for Internet addressing Sadly, PMDF Mail is a terminal based program, not a graphical interface However, it has more functionality and more powerful than any other email program See the Further Reading section for a document on PMDF Mail A graphical version of PMDF Mail is coming soon

PINE (executed with the PINE command) is the same IMAP/MIME UA used to access mail from remote computers Use it if you like that interface, but PMDF Mail is much more powerful and feature rich.

3.2 BNLDAG As A PC LAN Email System

The BNLDAG can be the mail gateway and post office for four of the major PC email systems· MicroSoft Mail, Lotus cc Mail, Novell MHS and Novell/WordPerfect GroupWise It gateways mail between each of these systems plus Internet, transparently converting message formats back and forward This eliminates the expense of buying gateways and mail servers, and the PC platforms they reside on

3.3 BNLDAG As An Internet POP/IMAP Client/Server Email System

The BNLDAG allows users to access their BNLDAG mail with Internet POP/IMAP clients from remote computers Whether you choose POP or IMAP, make sure they support MIME There are many good POP/MIME clients like Eudora The CCD Department has a site license for Eudora and an ILR with 40 dollars will get you the latest version plus CCD support PINE and Simeon (formerly ECSmail) are good IMAP/MINE clients PINE is free from the University of Washington

4.0 Email History Trends

4.1 Host-Base Trends

In the beginning, in the 1980's, email systems were host-based on time-shared mainframe/minicomputers. Email systems were easy to administer on one computer

4.2 PC LAN Trend

During the late 1980's, standalone PC's proliferated They were placed on Local Area Networks to increase productivity PC LAN email was born PC LAN email systems were then integrated with other PC desktop applications

Corporate America downsized The experts predicted the death of the mainframe/minicomputer A 1994 Client/Server Today survey shows PC LAN based email has grown to lead the market Note, some users use more than one type of email system:

PC LAN based email	49%
Minicomputer based email	37%
Mainframe based email	20%
Other	14%

An 1995 Infoworld survey shows what email client programs, the PC LAN users are buying

Lotus cc Mail	28%
Microsoft Mail	24%
Novell GroupWise	9%
On Technology DaVinci	8%
Banyan BeyondMail	8%
CE Software QuickMail	7%
Lotus Notes	4%
Other	12%

PC LAN email systems are limited to workgroups Large systems are hard to centrally manage

This email trend has peaked It will disappear A new trend is emerging

4.3 Client/Server Trend

In the mid-1990's, the client/server trend is coming on strong

The client/server system combines the best of of the two previous trends The UA is on a remote computer like PC LAN email. The MTA and mailboxes are on a mainframe/minicomputer server like a host-based system Mainframe/minicomputer systems can scale to encompass all server functions into one computer Eventually, PC LAN email will disappear, leaving the field to host-based systems and client/server systems

Even the PC software developers are losing interest in PC LAN email They are all creating client/server email systems like Microsoft's Exchange and Lotus's LCS Microsoft may not support the PC LAN MS Mail much longer

Meanwhile, the mainframe/minicomputers are making a comeback Sales are way up But they are not the "big iron" of old, but cheap, fast, multiprocessor, RISC computers, running Unix or NT An ITG study shows a LAN costs 3 times more to operate per user than a mainframe, a LAN costs 43 cents per transaction as compared to 3 cents on a mainframe The mainframe/minicomputers make great servers They place administration under one tent They easily and cheaply scale upward as demand increases--just add another processor board, SCSI disk, etc

5.0 Email Servers

Most organizations have many different email systems This forces the organization to buy a common interconnect program that allows an email system to send and receive mail, to and from, foreign email systems This program is called a mail hub and usually resides on a server computer The server need not be dedicated to mail, however, PC mail servers are usually dedicated to only mail

Mail hubs are also know as mail backbones, mail interconnects, mail gateways, mail switches, mail integration servers, etc. And of course, mail hubs are also loosely known as message transfer agents (MTA)

Here is partial list of commercially available mail hub programs

VENDER	PRODUCT	SUPPORTED PLATFORMS
Control Data	MailHub	Unix
DEC	MAILWorks	OpenVMS
HP	OpenMail	HP-UX,AIX,Solaris,SCO Unix, DEC
Innosoft	PMDF	OpenVMS, Digital Unix
Lotus	LCS	Unix, OS/2, Windows NT
Lotus	SoftSwitch EMX	Unix
MicroSoft	Exchange	Windows NT
Wingra	Missive	DEC

Some people would include in the above list the Sendmail program you get free on all Unix systems Sendmail is a bad MTA and mail hub Sendmail is difficult to administer and is buggy Do not use Unix systems as your mail hub if they use Sendmail Beware on Unix systems, behind that snappy email UA, like Zmail, is the ugly Sendmail MTA Unix vendors modify Sendmail with poor results

6.0 BNLDAG As An Email Server

The BNLDAG is an OpenVMS VAX computer With PMDF (Pascal Mail Distribution Facility) email software system , the BNLDAG becomes one of the best mail hubs in the world

PMDF is provided by Innosoft International, whose co-founder is Ned Freed, an author of SMTP/MIME, and who continues to be a major architect of future Internet email specifications New Internet standards are immediately implemented. Technical problems are handled by the software developers themselves

These are the email features currently available on BNLDAG If you need help with any feature, send email to opr@bnldag bnl gov

store-and-forward messaging system

PMDF serves as a centralized store-and-forward messaging system It goes to great lengths to deal with remote MTA's not responding properly and ensures reliable delivery It has a growing list of tricky algorithms to deal with noncomplying gateways and computers If PMDF fails sending your message, it retries every 4 hours for the next 12 days before giving up and returning your message, every 3 days you receive a status message reporting the difficulty

email systems

The BNLDAG with PMDF software simultaneously supports all three basic email systems

host-based email
Internet IMAP/POP client/server email
PC LAN client/server email

list server

BNLDAG is a list server It accepts email requests for subscription to and removal from various public mailing lists Some commands are SUBSCRIBE, UNSUBSCRIBE, DIRECTORY/LIST, SEND/LIST. .

mail server

BNLDAG is a mail server It distributes files or information in response to email requests Some commands are SEND, DIRECTORY, HELP, INDEX, INFO, LISTS.

X.500 directory access

BNLDAG provides X 500 directory services Access the ultimate directory the world is connecting to, to find an email address In VMS Mail, DECwindows Mail or PMDF mail, a popup query window occurs on character terminals or Xwindows, whenever, you place X500-FORM in the TO address field. X 500 is the International Directory Services standard accepted by all including the Internet community It consists of a hierarchy of world-wide directory servers providing directory information much like the present Internet Domain Name Servers do with computer names

PH/CCSO/QI/Gopher directory access

BNLDAG provides PH directory services PH directories are also known as CCSO, QI or Gopher directories Access the ESnet (Energy Science network) PH directory server to find the email address of people working for the national labs In VMS Mail, DECwindows Mail or PMDF mail, a popup query window occurs on character terminals or Xwindows, whenever, you place PH-FORM in the TO address field

gateways

BNLDAG gateways messages between many different networks and converts message formats when necessary It's native message format is Internet's MIME, ensuring no loss of data during message translation, since MIME is the superset message format of all other message formats All the major PC LAN email systems are gatewayed, giving PC LAN users access to the Internet and to each other

X.400 gateway

BNLDAG is connected to an X 400 gateway European and Canadian computer using X 400 email systems can be reached from BNLDAG with the ESnet gateway: es.net An example TO address using VMS Mail: in%"/s=jones/o=nersc/p=ESnet/a= /c=us@es net" If you are registered on LABMAIL, send mail to yourself in%"/s=jojo/o=bnl@es net"

Bitnet gateway

The Lab has cut the Bitnet link to save the $2000 a year Bitnet fee and the $3000 a year line costs BNLDAG now sends your outgoing Bitnet email to a remote Internet-Bitnet gateway (interbit cren net). This gateway will reliably get the email to the remote Bitnet node However, the remote Bitnet site may not be able to reply unless it is smart enough to use the same gateway to get back to BNLDAG

DECnet, UUCP, etc

BNLDAG is directly connected to DECnet It sends mail to UUCP networks via a gateway Many other rare networks are also linked with gateways

email firewall

PMDF provides the ability to hide the true email addresses of Lab personnel from off-site Good username and node name address remapping is provided

scaleabilty

BNLDAG can be moved to a faster DEC platform (VAX or ALPHA) if it gets loaded down

miscellaneous

PMDF supports mail delivery receipts, automated incoming mail handling (respond you are on vacation), personal email alias data base, etc

7.0 BNLDAG Email Possiblities

The BNLDAG with PMDF software can also provide the following features upon need

fax

Reliably send and receive fax as email No more waiting for the FAX machine FAXes are handled like email If the FAX modem is not available or the remote FAX machine is not ready, PMDF will keep trying to send the FAX every 4 hours for 12 days before returning the FAX to you Text and PostScript files can be FAXed Have your favorite applications, like WordPerfect or AutoCad, generate PostScript output and FAX them Addressing is simple The telephone number is the username, eg, 5167249999@text-fax ags bnl.gov Incoming FAXes are converted to PostScript and printed on local printers Approximate cost is $6,000

pager

Send email messages to remote alpha-numeric page receivers Application programs can also access pager, eg, a network monitoring program alerting the network manager on a network failure Addressing has the pager ID as username, eg, 1234@pager ags bnl gov Approximate cost is $500.

X.500 server

BNLDAG is a X 500 client It can become a X 500 server, providing email addresses and other information to other Lab computers Approximate cost is $6500

X.400 Gateway

If X 400 email becomes popular, the BNLDAG can convert Internet mail to the X 400 format and send it over OSI or Internet network protocols Powerful rules map addresses back and forth Approximate cost is $6500

8.0 Suggestions

- Use only Internet for email Make sure you forward mail with Internet as well. The MIME message format gets clobbered going over a non-Internet network like DECnet
- Use a MIME UA You need it to decode and display those attachments you will be getting.
- You can simultaneously use several of the three current email systems Each one has it's own unique features However, even though PC LAN email is the most popular today, it's future is dimmer than the other two
- If you use Internet's client/server email, try to select a UA that supports IMAP They are finally becoming available Use POP3, if an IMAP UA is not available Whichever you choose, make sure MIME is supported
- Seek Internet client/server solutions before buying Proprietary software Internet is exploding with free clients and servers Internet provides workgroup software like forums, documentation sharing (Web), directories, workflow, etc
  Lotus Notes can be duplicated with Internet features like email and Web browsers Internet makes the whole world a PC LAN, allowing say a data base reside on one computer, whereas, Lotus Notes must replicate a data base onto many PC LANs
  With proprietary PC software you have constant problems with licensing, limits on the number of clients per server, gateways,etc
- Remember email is not secure. Your message can be read and copied at many points between you and the recipient
- Make sure LABMAIL (bnl gov) forwards mail to you with Internet. DECnet clobbers MIME messages This has beeb done for BNLDAG users
- Becareful depending on LABMAIL It was good for it's time It needs upgrading Modern versions of LABMAIL (firewalls), map different formats of your name to your real username and host computer For example, john jones@bnl gov, j jones@bnl gov,

jones@bnl.gov get mapped to say jj@bnldag.bnl.gov. So the remote user doesnot have to know your user name Duplicate matches cause the mail to be returned with all the matches for a retry

LABMAIL has an 8 character user name maximum User Rubinstein becomes rubinst3 Numbers are used to distinguish between users with the same name. So even user jones becomes jones9 The remote user must know these distorted usernames to send mail

9.0 Further Reading

1 To contact BNLDAG administration, send email to opr@bnldag.bnl.gov

2 These are email documents available on the BNLDAG and on the World Wide Web Files with ".man" extensions are text documents and ".ps" are PostScript

Email Systems
    bnl$manual.email1.man,bnl$manual.email1.ps
PMDF Mail Program - VMS Mail Extension
    bnl$manual.email2.man,bnl$manual.email2.ps
PINE Mail Program - Remote access of Mail server via IMAP
    bnl$manual.email3.man,bnl$manual.email3.ps

3 PMDF manuals are are available online to those with Xwindows using the VMS Bookreader program The manuals are the PMDF User's Guide, PMDF Programmer's Reference Guide, PMDF System Manager's Guide, and more Execute the following command to open a Bookreader Xwindow

```
$SPAWN/NOWAIT/INPUT=NL  RUN SYS$SYSTEM DECW$BOOKREADER
```

or let a BNLDAG command file do it

```
$@bnl$com.xapp
```

In the Bookreader window, select Innosoft Documentation and then select Innosoft PMDF for VMS

4 The PMDF Mail program provides help on all it's commands

```
$email
> help
```

5 The PMDF Utility programs provide help

```
$help pmdf
```

6 BNLDAG administration has a hot line to PMDF software developers for technical problems

ADVANCED E-MAIL

THE FILE'S IN THE MAIL

E-mail by itself is a powerful tool, and by now you may be sending e-mail messages all over the place. You might even be on a mailing list or two. But there is a lot more to e-mail than just sending messages. If your host system does not have access to ftp, or it doesn't have access to every ftp site on the Net, you can have programs and files sent right to your mailbox. And using some simple techniques, you can use e-mail to send data files such as spreadsheets, or even whole programs, to friends and colleagues around the world.

A key to both is a set of programs known as encoders and decoders. For all its basic power, Net e-mail has a big problem: it can't handle graphics characters or the control codes found in even the simplest of computer programs. Encoders however, can translate these into forms usable in e-mail, while decoders turn them back into a form that you can actually use. If you are using a Unix-based host system, chances are it already has an encoder and decoder online that you can use. These programs will also let you use programs posted in several Usenet newsgroups, such as comp.binaries.ibm.pc.

If both you and the person with whom you want to exchange files use Unix host systems, you're in luck because virtually all Unix host systems have encoder/decoder programs online. For now, let's assume that's the case. First, upload the file you want to send to your friend to your host site (ask your system administrator how to upload a file to your name or "home" directory if you don't already know how). Then type

```
uuencode file file > file.uu
```

and hit enter. "File" is the name of the file you want to prepare for mailing, and yes, you have to type the name twice! The > is a Unix command that tells the system to call the "encoded" file "file.uu" (you could actually call it anything you want).

Now to get it into a mail message. The quick and dirty way is to type

```
mail friend
```

where "friend" is your friend's address. At the subject line, tell her the name of the enclosed file. When you get the blank line, type

```
~r file uu
```

or whatever you called the file, and hit enter (on some systems, the ~ may not work, if so, ask your system administrator what to use). This inserts the file into your mail message. Hit control-D, and your file is on its way!

On the other end, when your friend goes into her mailbox, she should transfer it to her home directory. Then she should type

```
uudecode file name
```

and hit enter. This creates a new file in her name directory with whatever name you originally gave it. She can then download it to her own computer. Before she can actually use it, though, she'll have to open it up with a text processor and delete the mail header that has been "stamped" on it. If you use a mailer program that automatically appends a "signature," tell her about that so she can delete that as well.

RECEIVING FILES

If somebody sends you a file through the mail, you'll have to go through a couple of steps to get it into a form you can actually use. If you are using the simple mail program, go into mail and type

```
w # file name
```

where # is the number of the message you want to transfer and file name is what you want to call the resulting file. In pine, call up the message and hit your O key and then E. You'll then be asked for a file name. In elm, call up the message and hit your S key. You'll get something that looks like this

```
=file request
```

Type a new file name and hit enter (if you hit enter without typing a file name, the message will be saved to another mail folder, not your home directory).

In all three cases, exit the mail program to return to your host system's command line. Because the file has been encoded for mail delivery, you now have to run a decoder. At the command line, type

```
uudecode file name
```

where file name is the file you created while in mail Uudecode will create a new, uncompressed binary file In some cases, you may have to run it through some other programs (for example, if it is in "tar" form), but generally it should now be ready for you to download to your own computer (on which you might then have to run a de-compressor program such as PKXZIP)

FILES TO NON-INTERNET SITES

What if your friend only connects with a non-Unix system, such as CompuServe or MCIMail? There are programs available for MS-DOS, Apple and Amiga computers that will encode and decode files Of course, since you can't send one of these programs to your friend via e-mail (how would she un-encode it?), you'll have to mail (the old-fashioned way) or give her a diskette with the program on it first Then, she can get the file by e-mail and go through the above process (only on her own computer) to get a usable file Remember to give her an encoder program as well, if she wants to send you files in return

For MS-DOS machines, you'll want to get uunecode com and uudecode com Both can be found through anonymous ftp at wuarchive wustl edu in the /mirrors/msdos/starter directory The MS-DOS version is as easy to use as the Unix one Just type

```
uudecode filename ext
```

and hit enter

Mac users should get a program called uutool, which can be found in the info-mac/util directory on sumex-aim stanford edu

Think twice before sending somebody a giant file Although large sites connected directly to the Internet can probably handle mega-files, many smaller systems cannot Some commercial systems, such as CompuServe and MCIMail, limit the size of mail messages their users can receive. Fidonet doesn't even allow encoded messages In general, a file size of 30,000 or so bytes is a safe upper limit for non-Internet systems

GETTING FTP FILES VIA E-MAIL

To help people without ftp access, a number of ftp sites have set up mail servers (also known as archive servers) that allow you to get files via e-mail You send a request to one of these machines and they send back the file you want. As with ftp, you'll be able to find everything from historical documents to software (but please note that if you do have access to ftp, that method is always quicker and ties up fewer resources than using e-mail)

Some interesting or useful mail servers include

mail-server@rtfm mit edu Files of "frequently asked questions" related to Usenet, state-by-state lists of U S representatives and Senators and their addresses and office phone numbers

archive-server@eff org Information about the Electronic Frontier Foundation, documents about legal issues on the Net

archive-server@cs widener edu Back copies of the Computer Underground Digest and every possible fact you could want to know about "The Simpsons "

netlib@uunet uu net Programs for many types of personal computers, archives of past postings from many Usenet newsgroups

archive-server@ames arc nasa gov Space-related text and graphics (GIF-format) files

service@nic ddn mil Detailed information about Internet

Most mail servers work pretty much the same -- you send an e-mail message that tells them what file you want and how you want it sent to you The most important command is "send," which tells the computer you want it to send you a particular file

First, though, you'll need to know where the mail server stores that file, because you have to tell it which directory or subdirectory it's in There are a couple of ways to do this You can send an e-mail message to the archive-server that consists of one line

```
index
```

The server will then send you a directory listing of its main, or root directory You'll then have to send a second message to the archive server with one line

```
index directory/subdirectory
```

where that is the directory or directory path for which you want a listing An alternative is to send an e-mail message to our old friend archie, which should send you back the file's exact location on the archive-server (along with similar listings for all the other sites that may have the file, however)

Once you have the file name and its directory path, compose a message to the archive server like this:

```
send directory/subdirectory/file
```

Send off the message and, anywhere from a few minutes to a couple of days later, you'll find a new message in your mailbox a copy of the file you requested The exact time it will take a file to get to you depends on a variety of factors, including how many requests are in line before yours (mail servers can only process so many requests at a time) and the state of the connections between the server and you.

Seems simple enough It gets a little more complicated when you request a program rather than a document Programs or other files that contain unusual characters or lines longer than 130 characters (graphics files, for example) require special processing by both the mail server to ensure they are transmitted via e-mail Then you'll have to run them through at least one converter program to put them in a form you can actually use. To ensure that a program or other "non-mailable" file actually gets to you, include another line in your e-mail message to the server

```
encoder
```

This converts the file into an encoded form. To decode it, you'll first have to transfer the file message into a file in your home directory

One further complication comes when you request a particularly long file. Many Net sites can only handle so much mail at a time. To make sure you get the entire file, tell the mail server to break it up into smaller pieces, with another line in your e-mail request like this

```
size 100000
```

This gives the mail server the maximum size, in bytes, of each file segment. This particular size is good for UUCP sites Internet and Bitnet sites can generally go up to 300000 When you get all of these files in mail, transfer them to your home directory Exit mail and call up each file in your host system's text processor and delete each one's entire header and footer (or "signature" at the end). When done with this, at your host system's command line, type

```
cat file1  file2 > bigfile
```

where file1 is the first file, file2 the second file, and so on. The > tells your host system to combine them into a new megafile called bigfile (or whatever you want to call it) After you save the file to your home directory, you can then run uudecode, tar, etc. One word of caution, though: if the file you want is long enough that it has to be broken into pieces, think of how much time it's going to take you to download the whole thing -- especially if you're using a 2400-baud modem!

There are a number of other mail servers. To get a list, send an e-mail message to mail-server@rtfm.mit.edu:

```
send usenet/comp.sources.wanted/How_to_find_sources_(READ_THIS_BEFORE_POSTING)
```

You'll have to spell it exactly as listed above. Some mail servers use different software, which will require slightly different commands than the ones listed here. In general, if you send a message to a mail server that says only

```
help
```

you should get back a file detailing all of its commands.

But what if the file you want is not on one of these mail servers? That's where ftpmail comes in. Run by Digital Equipment Corp. in California, this service can connect to almost any ftp site in the world, get the file you want and then mail it to you. Using it is fairly simple -- you send an e-mail message to ftpmail that includes a series of commands telling the system where to find the file you want and how to format it to mail to you.

Compose an e-mail message to

```
ftpmail@decwrl.dec.com
```

Leave the "subject:" line blank. Inside the message, there are several commands you can give. The first line should be

```
reply address
```

where "address" is your e-mail address. The next line should be

```
connect host
```

where "host" is the system that has the file you want (for example wuarchive.wustl.edu). Other commands you should consider using are "binary" (required for program files), "compress" (reduces the file size for quicker transmission) and "uuencode" (which encodes the file so you can do something with it when it arrives). The last line of your message should be the word "quit".

Let's say you want a copy of the U.S. constitution. Using archie, you've found a file called, surprise, constitution, at the ftp site archive.cis ohio-state.edu, in the /pub/firearms/politics/rkba directory. You'd send a message to ftpmail@decwrl.dec.com that looks like this

```
reply adamg@world std.com
connect archive cis ohio-state edu
binary
compress
uuencode
get pub/firearms/politics/rkba/constitution
quit
```

When you get the file in your mailbox, use the above procedure for copying it to a file   Run it through uudecode. Then type

```
uncompress file.name
```

to make it usable.

Since this was a text file, you could have changed the "binary" to "ascii" and then eliminated the "uuencode" file   For programs, though, you'll want to keep these lines   One caveat with ftpmail it has become such a popular service that it could take a week or more for your requested files to arrive

THE ALL KNOWING ORACLE

One other thing you can do through e-mail is consult with the Usenet Oracle   You can ask the Oracle anything at all and get back an answer (whether you like the answer is another question)

First, you'll want to get instructions on how to address the Oracle (he, or she, or it, is very particular about such things and likes being addressed in august, solemn and particularly sycophantic tones)   Start an e-mail message to

```
oracle@iuvax.cs indiana.edu
```

In the "subject " line, type

```
help
```

and hit enter   You don't actually have to say anything in the message itself -- at least not yet. Hit control-D to send off your request for help   Within a few hours, the Oracle will mail you back detailed instructions. It's a fairly long file, so before you start reading it, turn on your communications software's logging function, to save it to your computer (or save the message to a file on your host system's home directory and then download the file) After you've digested it, you can compose your question to the Oracle Mail it to the above address, only this time with a subject line that describes your question Expect an answer within a couple of days And don't be surprised if you also find a question in your mailbox -- the Oracle extracts payment by making seekers of knowledge answer questions as well!

UNIX EMail Software - a Survey

Chris Lewis
clewis@ferret ocunix.on.ca
[and a host of others - thanks]

Changes

- Updated Pine authors and contact info
- Added MX record glossary item.

Note this FAQ has been formatted as a digest Many newsreaders can skip to each of the major subsections by pressing ^G

~Subject Introduction

Configuring electronic mail systems can be quite a complicated subject Often far more complicated than, say, setting up a USENET news feed This is because, unlike news, email is expected to traverse multiple types of networks using their own protocol, whereas, USENET news tends to be a single protocol supported by hook or by crook on different networks.

This document is intended for system administrators who need to know how to set up their UNIX systems for email communication with the outside world It is intended for the email-naive SA who gets more than a little confused by the acronyms, RFC's and plethora of software

This is intended to be a general survey of the software available, so I won't spend too much time on some of the details. Most of the available software comes with documentation that can explain things much better than I can

Additional detail can be obtained from several sources, such as:

> Quarterman, John S.· "The Matrix -- Computer Networks and Conferencing Systems Worldwide", Digital Press 1990, (Order No. EY-C176E-DP), ISBN 1-55558-033-5,
>
> Adams, Rick and Frey, Donnalyn: !%@:. A Directory of Mail Addressing and Networks, 2nd Ed., O'Reilly & Associates 1990, ISBN 0-937175-15-3

Further, this is primarily oriented towards UNIX email systems. This is unfortunate, because it would be nice to have a general document covering email in all of its forms. However, each operating system tends to have radically different email mechanisms, so it would be difficult to do justice to any other environment It seems more useful to cover one environment well here, and have companion documents for other environments. Speaking of which, why hasn't anybody else stepped in to do FAQs on other environments? Like DOS, Mac etc

And finally, this document is not intended to be pedantically correct Knowledgeable readers will know that I'm glossing over a lot of detail, and absolute precision has been balanced against readability and effectiveness in helping people get going

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~Subject. Layout

This FAQ is laid out in the following sections

+ An overview of how mail systems go together

+ A glossary of the important terms to know

+ A list of general do's and don'ts of mail systems

+ Configuration Issues

+ Several suggested mail configurations

+ General overviews of specific software

~Subject: Electronic mail - A General Overview of Structure

Electronic mail generally consists of three basic pieces:

1) The link level transport - which could be UUCP, TCP/IP, or a host of others. We'll call this the "transport medium" (TM)

2) the "Mail Transport Agent" (MTA) which is responsible for transporting mail from source to destination, possibly transforming protocols, addresses, and routing the mail

   The MTA often has several components
   - Routing mechanisms
   - Local delivery agent (LDA)
   - Remote delivery agent

   Many MTA's have all of these components, but some do not. In other cases, it is possible to replace certain components for increased functionality

3) The "User Agent" (UA) is the user interface - the software that the user uses to read his mail, sort things around in folders, and send mail Sometimes called "Mail User Agent" (MUA)

~Subject: Glossary

Rather than alphabetic, this glossary tends to group terms referring to similar functionality together.

Transport Medium

UUCP (Unix to Unix Copy Program)

Back in the mists of time, UNIX systems communicated only over RS232 serial lines, usually over modems UUCP is a suite of programs developed back in the early 70's to provide this communications link. All that UUCP does is transfer files from one system to another There is an additional mechanism where one system can direct the destination system to run a file through a specific program Electronic mail in UUCP is simply requesting the destination machine to run "mail" on a data file

UUCP communicates by means of "protocols", the most common being "g", a method for transmission of data over telephone lines and ensuring that the data is not corrupted. There are several other protocols, none universally available, and most oriented towards communication media other than telephone voice lines (such as dialup X.25, PAD X.25, or LAN connects)

UUCP operates over fixed system-to-system links, so sending mail from one system to another often has to traverse other intermediate systems

TCP/IP (Transmission Control Protocol/Internet Protocol):

TCP/IP is a protocol that allows any system on a network to talk "directly" to any other, by passing packets of information back and forth TCP/IP (and its later relative OSI) is usually used over networks built on top of Ethernet, Token-Ring, Starlan and other LANS

SMTP:

Or, "Simple Mail Transfer Protocol", is the communications protocol used most commonly over TCP/IP links in UNIX environments for mail. SMTP usually operates directly between the source and destination machines, so intermediate machines don't get involved (except for gateways, see below). SMTP is usually part of the MTA

SLIP (Serial Line Internet Protocol)

SLIP is an implementation of TCP/IP designed for use over RS232 serial lines (ie modems) The other difference is that some SLIP implementations have the ability to "dial the phone" to make a connection for a specific transfer, whereas LAN TCP/IP is physically continuously connected. You'd also need TCP/IP to run a SMTP mail connection.

PPP (Point-to-Point Protocol)

A successor to SLIP.

X 25/X.29:

X 25 is a packet switched data network which is usually half-duplex In this context, it's really an alternative to dialup over voice telephone lines with modems. X 25 is available in several "flavours", either direct X 25 trunk connects over leased lines, through "PAD" interfaces, or by ordinary dialup modem access to X 25 "ports".

To be useable in the context of mail transfers, you also have to use a file transfer protocol/mechanism of some sort on top of X 25 The most common being UUCP "f" protocol (through PADS or dialup), or "x" with direct X 25 connects

Whether you use X 25 or phones plus modems depends on a number of factors - usually the determining factor is cost. In North America, high speed modems (eg. 9600 baud and above) over telephone lines tends to be less expensive However, Europe's really wierd phone system structure usually makes X 25 more cost-effective and therefore, X 25 use in UNIX mail systems is much more common in Europe than North America

X 29 is the command set used to configure and establish X 25 connections

Networks:

Internet:

Ah, the Internet .. A subject to warm the toes on a frosty night.. For our purposes, suffice it to say that it is a vast loosely coupled network of hundreds of thousands of machines using Internet protocol mail, communicating with each other largely by TCP/IP and SMTP over relatively high speed lines. The Internet grew out of a US government funded project in inter-computer communications that grew into an enormous network of systems using similar software. One of the principle characteristics of this network is that machines are addressed by domain names which identify the destination, rather than addresses that are constructed out of the route from machine-to-machine-to-machine.

UUCP Network:

The UUCP network is that set of machines that talk to each other via UUCP. Sending mail through this network requires that the send know the network topology of UUCP links, and specify a path from on machine to the next (There are, of course, ways around this See the section on "do's and don'ts")

Mail addresses:

Addresses

An email address is a method of specifying a given person on a specific machine There are scads of conventions, usually determined by the presence of "@"'s, "!"'s and other special characters in the name An address usually consists of two parts a userid/name and a machine specification.

A Domain address usually looks like

userid@domain-address

Whereas a UUCP address usually looks like

siteA!siteB!siteC!userid

Domain Addresses:

Domains are a way of uniquely specifying a destination Much like a postal address, a domain specifies a set of progressively more restrictive "domains" of the potential address space It would perhaps be illustrative to give an example

clewis@ferret marketing fooinc com

You read these things right to left "com" means the commercial domain "fooinc" is the name of an organization within the commercial domain. "Marketing" is the name of a suborganization within fooinc, and ferret gives the name of a machine (usually) Domains can have any number of levels

The top level domain (com in the above example) has many possible values In the United States, "com", "mil", "edu", and "gov" are fairly standard Elsewhere, the top level domain tends to be a country code, the second level tends to be a province or state, OR a classification like "edu" or "ac" for academic (such as ac jp, go.jp, ac uk, edu au, etc) and the third an organization But, for example, there are many com and edu sites in Canada and other countries.

FQDN

A fully-qualified-domain-name (FQDN) has a entry for each level of the domain, from individual machine to top-level domain. In many cases, an organization has implemented an organizational "gateway" at a higher level of domain, so that people from outside don't have to specify FQDN's to get to a specific person In the above example, for instance, "fooinc.com" may be sufficient to get to anyone inside fooinc, and "ferret.marketing" may not be necessary

On the other hand, people sometimes leave out the higher levels of the address, as in "ferret.marketting" This is a bad idea because if the mail is cc'd out of the organization, chances are the external recipient cannot reply, because "ferret.marketing" is incomplete So use addresses that are specified sufficiently for external users to use (fooinc com if a organizational gateway is used, the whole ferret.marketing fooinc com if not)

NIC

Internet TOP-LEVEL domains (edu, com, gov, mil) are controlled by a single organization, the NIC (nic ddn mil) An organization "gets a piece" of the namespace by registering with the NIC, and then they are free to administer their own namespace (everything under fooinc.com) as they choose. The same is true for foreign countries; Once they have their top-level domain (usually the two-letter ISO country code) registered with the NIC, they do the rest, and divide it as they see fit

In contrast, on UUCPnet, all machine names everywhere share a single flat namespace So it is important to choose a name that has not been used before (See do's and don'ts). This is why FQDN's help. We can tell the difference between ferret.fooinc.com and ferret.blah.edu by their full names (Instead of UUCP paths which may turn out to be wrong, and autorouting will probably send the mail to the wrong machine)

MX record

A non-SMTP/Internet site that wishes to register on the Internet will need to get a "nearby" Internet site to set up a MX record for them. An MX record is essentially a domain-server database record that (effectively) registers your domain name on the Internet, and indicates that the Internet site knows how to forward mail to you Usually via some non-SMTP/Internet route, such as UUCP. You can get an MX record for one site, or a "wildcard" MX record so that you can have your own subdomains

Bang-Paths

With UUCP mail, the MTA has to specify a route to get from one machine to another. "A!B!C!userid" means go to machine A, then B, then C, then user "userid" on C. You should strive, however, for a MUA that allows you to use domain addressing, and let the MTA figure out the bang routing as appropriate.

Miscellaneous:

Gateways

There are several meanings of this term, only two are relevant here

The first is a mechanism for getting from one network to another network that uses different protocols.

The second is a mechanism for getting from one logical (often organizational) network to another using the same protocol. Often for example, there will be a LAN in one department of an organization, and one machine in the LAN has the connection to another LAN in another department. This means that mail from one LAN to the other has to pass thru the gateway machine

Routers:

There are several definitions, but the most important is that part of the TA that figures out how to send a message to a given machine   This often uses a database that provides routes from one machine to the other machines on the network

Smarthost

In many cases, your machine won't know how to get to a specific destination   You can usually set up your mail system to send mail, that it doesn't know how to deliver, to a machine that is more likely to.

RFC's

A set of documents that include formal descriptions of mail formats used on the Internet, and are adhered to by many non-Internet systems. More specifically, in the "worldnet" of USENET, Internet and UUCP, the RFC's set the standards for mail exchange   RFC822, 1123 and 976 are the most important for Internet/UUCP mail

It should be pointed out, however, that there are some regions where the RFC's are not entirely respected   For example, the British academic email networks (JANET) uses domains, but they're specified backwards (they drive on the wrong side of the road too ,-)

X 400

A CCITT standard for email formats, more or less an alternative to RFC 822/976/1123   This format will probably start taking over from RFC 822/976/1123 mail   It is likely to (already has?) become ISO/IEEE standard along with OSI etc

"The Maps"

A set of files describing machine-to-machine links distributed over USENET in the group comp mail maps   These are usually posted on a monthly schedule, and can be automatically received and transformed into a routing database that describes the "optimal" route to each machine   These are operated by the "UUCP Mapping Project"   See the README posted along with the maps for more details

Aliases

Aliases are a mechanism by which you can specify the destination for mail on your machine   Through the use of aliases you can redirect mail to "virtual userids"   For example, you should have a mail destination on your machine called "postmaster", which is aliased to send the mail to the System Administrator (ie you probably)   Aliasing often also permits you to send mail to groups of users (not necessarily on the same machine as you) pipelines of commands or to specific files

Mailing lists

Are similar to USENET newsgroups   They are usually aliases pointing to groups of users, and allow mail to be sent to the whole group at once   Mailing lists are set up to carry certain subjects   The difference between a mailing list and a USENET newsgroup is that the messages are sent by mail, probably as a copy to each recipient, rather than broadcast

----

-Subject Do's and Don'ts

1) Register a domain name   Even on UUCP, where UUCP is often used as a kludge, it is MUCH preferred that you obtain a real

domain address If you are directly connecting to the Internet, you will get one as part of your registration with the NIC.

If you aren't connecting directly to the Internet, obtaining a registration will usually require you finding a nearby friendly Internet site willing to act as a mail forwarder to you from the Internet - the site that will set up a "MX record" for you. Many sites will do this for you for free, and several of the commercial email services (eg. uunet) will do it for you for a nominal charge (without requiring you buy the rest of their services)

There are occasions where you can join what is called a "domain park" These are most often small regional groups of systems that have gotten one of their number properly registered as a domain, and provides forwarding services out to other systems For example, in my address "ferret ocunix on.ca", "ocunix on.ca" is a domain park made up of the Ottawa-Carleton UNIX User's Group, one of the other machines in the group provides a gateway between our systems and the Internet

2) If your machine is going to "speak" UUCP to the outside world, choose a unique UUCP name. You can find out whether a name you want is taken by consulting the UUCP maps. Or by asking someone else who's using them.

3) Register your machine with the UUCP Mapping Project. Information on how to do this is included in the monthly maps postings in the file "README". This is usually only required when your machine talks UUCP to the outside world, or when other machines have to address you by your UUCP name If you don't do this, somone else may choose the same name, and gross confusion will arise when smart routers won't be able to tell whether to send a piece of mail to you, or your doppelganger[s] If you register with the UUCP Mapping Project, you have prior use, and people who choose the same name afterwards will be told to get a new one

If you're "behind" an organizational gateway, don't do this (Your organizational gateway is the thing that needs to be registered)

If you do fill in a map, please take the time to fill it in carefully, giving contact people and phone numbers Just in case your machine goes crazy and starts doing something nasty Note expecially the latitude and longitude Get it right, or omit it Brian Reid gets really annoyed with sites that are half a world away from where they really are

3) If you're going to be setting up multiple machines, have only one or two connections to the outside world

4) Install a mail system that understands domain addressing, even if you aren't registered (In fact, all of the suggested configurations in this FAQ do)

5) *Never* use UUCP bang-routing with the MUA if you can possibly avoid it - each of the suggested mail configurations provide mechanisms where you, the user, do not have to specify routes to the MUA - you can specify domains, and the TA will do the routing (possibly bang-routing) for you.

6) Find a friendly neighboring SA to help A SA who has already operating mail in your area will help smooth over the regional

"gotchas" that are bound to crop-up. And advise you on the right software to use, where to obtain it, and how to install it

7) Do NOT use "any old" Map unpacking program Most available map unpacking programs automatically run the shell (or shar) to unpack map articles Since it is trivially easy to forge map articles, using this type of unpacking program can easily let very destructive trojan horse or virus programs into your machine

   The two specific map unpackers described in this FAQ are known to be secure from such attacks Do not run any other unpacker unless you are aware of the issues and can inspect the code for such vulnerabilities [If you know of other "secure" map unpackers that are generally available, please let me know]

-Subject· Configuration Issues·

What you need for email connectivity is determined by

1 What networks you intend to connect to
  The Internet (hence SMTP)? UUCP sites? X 400?
  Bitnet? Others? Combinations?
2 What links you have or are willing to install
  Internet T1? T2? UUCP? Other? [Details on how to make your connections is beyond the scope of this FAQ, but can usually be found out from the provider (other end) of the link]
3 what user interface you want to use This is largely an independent issue, so consult the Specific Package Reviews directly

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-Subject. Recommended MTA Configurations

These configurations are based upon my own experience, and the experience of others Careful installation of any of these configurations will result in a solid, reliable mail system that respects the appropriate "do's and don'ts" Each configuration represents a compromise of ease of installation and maintenance versus sophistication and capabilities

One thing you should consider is what you already have on your system You will invariably have "binmail", and will have a good chance at already having sendmail Some systems come with smail (if 2 3, junk it) The configurations shown below are *minimal* configurations, so you should consider whether you want to use what you already have or not

Scenario 1 Only UUCP connections

Smail 2 5 If you want to set up a routing database of your own, you will also need pathalias, and unpackmaps or uuhosts Instead, though, you can configure smail 2 5 to smart-host most destinations to a nearby friendly site who'll do your routing for you without having to run the routing software Note further, that you can run pathalias on just a subset of the full set of maps [Unpackmaps makes this particularly easy to do]

Smail 2 5, as shipped, does not support mail-to-pipeline or mail-to-file aliasing If you need these, at a minimum, you should obtain lmail If you intend more than casual use of these features, it is recommended that you obtain deliver instead of lmail

Even if you have sendmail already, you can integrate smail 2.5 with it to do your UUCP routing (though, some later versions of sendmail can do routing themselves)

(See the note regarding smail 2 7 in the Package Reviews)

Scenario 2 SMTP connections (optionally, some UUCP connections too)

Generally speaking, sendmail will do this for you and you have a good chance to have it already However, for the novice, it is recommended that smail 3 be used instead [see review of sendmail below]. Smail 3 includes all of the routing software and can do mail-to-pipeline and mail-to-file, so none of the auxiliary programs mentioned in scenario 1 are necessary

Most sendmail don't include UUCP routing mechanisms, so you would need pathalias and unpackmaps or uuhosts if you wish to set up a UUCP routing database. Further, most sendmails don't know how to query a pathalias database directly, so you may have to hack your own path lookup program into the sendmail cf (smail 2 5 can be used for this purpose provided that you will have a UUCP link to the outside world)

Both MMDF and PP can also be used

Deliver or procmail are still quite useful in this configuration for extended alias facilities

Scenario 3 Connections to other networks (optionally including SMTP or UUCP), or very high loading

You are limited to sendmail, MMDF, PP or zmailer. The latter three are probably easier to deal with

There are other configurations See the Package Reviews to determine which packages are appropriate

----

~Subject Package Reviews

Honesty requires me to point out which software packages were reviewed by their author (including me ,-). I do so by appending a "*" to the name of the author In some cases, the material has been cribbed from FAQ's or general information blurbs.

It is worth noting, though, that most of these packages are well known, and have been in operation at many sites for periods of a year or more These packages do their job well, and have been extensively thrashed out in the best debugging laboratory in the universe (USENET ;-)

A few packages have been mentioned prior to their release. (Smail 2 7, unpackmaps 4, the occasional beta version) It is recommended that these versions be avoided by novices until they have had a chance to settle for a little while This FAQ will note when such software seems (according to rumour *I* hear) to be stable enough for general use.

Some of these packages are capable, by various bits of hackery, of doing a lot more than is claimed for them But I refrain on telling you how to "take the covers off" Given the intended audience, that would be tantamount to trying to teach preschoolers do-it-yourself brain surgery Please don't take this as condescending - I've been working on/in/with email systems for over 12 years and I *still* won't play with (as just one example) sendmail.cf's

Therefore, I restrict myself largely to "out-of-the-box" functionality, "fill-in-the-blank" configurability, and normal documented installation procedures Beyond that, you're on your own

binmail

binmail is usually really called "mail" On System V prior to Release 4, it is a really simple UA that does dual duty as the TA It's pretty awful because it doesn't know how to set up headers properly, doesn't even know what a "Subject " line is, and there's no way to do any kind of aliases

On BSD, binmail invokes sendmail to do the MTA function On System V prior to Release 4, you really do want to replace binmail's MTA functionality with something else However, you should not replace it in its "mail" (UA) functionality, because many system-level administration mechanisms will break Any new UA should be installed as a different name than "mail"

Beginning with System V Release 4, "binmail"'s transfer agent capabilities were considerably enhanced to have similar capabilities to Smail 3 and sendmail There is usually no need to replace it with another mail agent (See SVR4 mail discussion below)

Binmail stores mail in "mbox" format

rmail

binmail's TA functionality is implemented by linking mail to rmail It's rmail that you'd want to replace with smail 2 5 etc

Mail

The original BSD UA. It can support local profiles, aliases, folders, header previewing, out-going mail recording and all sorts of good stuff An "okay" UA Available from BSD "freed-sources" archives

Mail stores mail in "mbox" format

mailx

AT&T's answer to BSD "Mail", from which it is descended Some versions such as the 3b1 one, should be avoided because of a buggy port Not available in source form (it's proprietary but ubiquitous enough to be mentioned here)

Mailx stores mail in "mbox" format.

mush author Dan Heller*

The "Mail User's Shell" is a "shell" for mail users That is, it has its own environment where you can configure not only the user interface, but the actual internal mechanisms Internally, mush has a csh-like scripting language, altho it's not as powerful as csh It has command-line aliases, file completion, if-else statements, command piping, and so on Because you can build your own commands, you can virtually build your own library of email features

Mush has two tty-based interfaces: the standard tty-mode (ala BSD Mail or sys-v mailx) and the fullscreen/curses mode (ala vi, emacs or even Elm) You can set up key bindings that execute one or more mush commands, personalized commands or even UNIX commands. You can even emulate keyboard input with keyboard macros and mappings

Mush also has a SunView interface that is more powerful than Sun's Mailtool, yet backwards compatible with most versions Most sunview users (if there are any left these days) prefer MushView over Mailtool.

The current version of Mush is 7 2 3, last posted in comp.sources misc volume 18 (with subsequent patches) All three interfaces are available in one runtime binary Except for the MushView interface (which is only available on for suns), Mush is portable to everything that runs UNIX. There is also a DOS port available for PCs and can run on most 286 machines. An older version of Mush (6.5) can run on as little as 640 of RAM. (Mush-PC is typically used with UUPC)

The "next generation" of Mush is a commercial product called Z-Mail from Z-Code Software (mail argv@z-code.com for details). All aspects of Mush are retained, yet it has grown to be far more powerful It runs under X windows with either a Motif or Open Look interface and also supports multi-media, user "functions" and a suite of new features.

Third party documentation is available from O'Reilly in the book entitled "The Z-Mail Handbook" (by Hanna Nelson) This book not only covers Z-Mail, but Mush as well

Mush stores its messages in "mbox" format, or MMDF format if you're using MMDF as your MTA

The newsgroup comp mail mush is dedicated to it.

[Note Z-Mail is not related at all to Zmailer Zmailer is a MTA]

lm coordinator Syd Weinstein*

(cribbed from comp mail.elm FAQ)

Elm is designed to run with "sendmail" or "/bin/rmail" (according to what's on your system) and is a full replacement of programs like "/bin/mail" and "mailx" The system is more than just a single program, however, and includes programs like "frm" to list a 'table of contents' of your mail, "printmail" to quickly paginate mail files (to allow 'clean' printouts), and "autoreply", a systemwide daemon that can autoanswer mail for people while they're on vacation without having multiple copies spawned on the system

The most significant difference between Elm and most other mail systems is that Elm is screen-oriented Upon further use, however, users will find that Elm is also quite a bit easier to use, and quite a bit more "intelligent" about sending mail and so on

Current release is Elm 2.3 PL11, comp sources.unix vol 22, issues 60-85 Patches in c s u vol 24, issue 25-35 Patches are also available from the archive server at DSI COM

```
    send mail to archive-server@DSI COM
    send elm index
```

[Ed elm is particularly good for novices. The only drawback that I've heard is that elm is a bit less user configurable than, say, mush]

MM. Contact Joseph Brennan*
Columbia University in the City of New York

(cribbed from MM man page)

mm is a powerful electronic mail system which allows you to send, read, edit and manage messages quickly and easily It is designed to have th same interface as the MM program written and developed for DEC20s over period of many years

mm was written using the CCMD package developed at Columbia. Thus, it has copious internal help, completion of partially typed commands on us of the TAB key, and help on partial commands when ? is typed

mm can read several mail-file formats Its default is mbox, the same format used by unix mail It also can read babyl, used by emacs rmail, and mtxt and MH It can copy messages from one file type to another

MM is a Freeware MUA copyright by Columbia University (as is this description)

MM is available by anonymous ftp from cunixf.cc columbia.edu, directory The file mm-intro txt there is a longer description of how it was devel

[Ed MM also appears to be a good UA for novices From the examples in the manual page, it handholds extensively and is not screen oriented

MH Maintainer John Romine

The big difference between MH and most other "mail user agents" is that you can use MH from a UNIX shell prompt In MH, each command is a separate program, and the shell is used as an interpreter So, all the power of UNIX shells (pipes, redirection, history, aliases, and so on) works with MH--you don't have to learn a new interface other mail agents have their own command interpreter for their individual mail commands (although the mush mail agent simulates a UNIX shell) Mail messages are stored in individual files

The current version of MH is 6 7 2 MH comes standard with Ultrix 4 0 and later, and AIX 3 1 and later
via anonymous ftp

```
    ics uci edu [128 195 1 1]         pub/mh/mh-6 7 tar Z    1 6MB
    louie udel edu [128 175 1.3]  portal/mh-6 7 tar Z        1 6MB
```

A new version of MH that supports multi-part multi-media mail is currently in alpha-test

comp mail mn discusses MH, and contains a FAQ article

GNU Emacs Rmail

Rmail is an Emacs subsystem for reading and disposing of mail Rmail stores mail messages in Rmail files in BABYL format (originally used under the ITS operating system), although it can incorporate new mail from MMDF and Unix format files, or mixed-format files Reading the messages in an Rmail file is done in a special major mode, Rmail mode, which redefines most letters to run commands for managing mail.

Rmail can do the standard things such as displaying, deleting, filing, or replying to messages Replying uses another Emacs subsystem, Mail mode. Messages can be saved in either BABYL or Unix format Rmail maintains per-message attributes and user-defined labels Rmail can burst message digests

VM Author Kyle Jones*

VM (View Mail) is a GNU Emacs subsystem that allows UNIX mail to be rea and disposed of within Emacs Commands exist to do the normal things expected of a mail user agent, such as generating replies, saving messages to folders, deleting messages and so on There are other more advanced commands that do tasks like bursting and creating digests, message forwarding, and organizing message presentation according to various criteria

The current version of VM is VM 4 41
FTPable from.

ab20.larc nasa.gov	pub/vm/vm-4 41.tar Z
ftp uu net	pub/vm-4 41 tar Z
tut cis.ohio-state edu	pub/gnu/emacs/elisp-archive/packages/vm-4 4

VM is discussed in gnu.emacs vm info, or by mailing list by sending an e-mail request to info-vm-request@uunet.uu.net.

MH-E. Maintainer. Stephen Gildea

MH-E is an interface to MH from within GNU Emacs. It helps if MH was compiled with the MHE compiler flag. MH-E is distributed with both GNU Emacs and MH Choose the later version.

C-Client Author Mark Crispin

Software writers only

C-client is a general library useful for creating MUA's It provides a high level logical interface for retrieving and manipulating mail messages It supports the latest draft of MIME (proposed Internet standard for multipart, multimedia, typed electronic mail) It is driver based, and easily ported to new platforms and MTA's, already supports BSD, SysV, DOS, Macintosh and TOPS-20(!), and supports present mail and mailbox formats

Just the thing if you want to write a new MUA

Contact the author for more details

MailManager Author Mark Crispin

A MUA implemented using C-Client for NeXT computers.

Pine. Authors Lundblade, Seibel, and Crispin

Pine is a mailer developed by the University of Washington Office of Computing and Communications. It has been designed for ease-of-use and with the novice computer user in mind It is based on Internet mail protocols (e g. RFC-822, SMTP, IMAP, and MIME) and currently runs on a variety of UNIX platforms

The guiding principles for achieving ease-of-use in Pine were· careful limitation of features, one-character mnemonic commands, always-present command menus, immediate user feedback, and high tolerance for user mistakes It is intended that Pine can be learned by exploration rather than reading manuals

A stand-alone version of Pico, Pine's message composition editor, is al included It is a very simple and easy to use text editor with text justification and a spelling checker

Features

- Mail index showing a message summary which includes the status, sender, size, date and subject of messages
- View and process mail with the following commands   forward, reply save, export, print, delete, capture address and search
- Address book for saving long complex addresses and personal distribution lists under a nickname
- Multiple folders and folder management screen for filing messages
- Message composer with easy-to-use editor and spelling checker The message composer also assists entering and formatting addresses and provides direct access to the address book.
- Online help specific to each screen and context
- Supports access to remote mail repositories via the IMAP2 protocol defined in RFC-1176
  - Soon to support multi-part mail conforming to proposed MIME In standard, allowing sending of sounds, graphics such as GIF and TIF files, and binary files such as spreadsheets

Pine, including source code, is freely available via anonymous FTP from ftp cac.washington edu on the Internet Other provisions for distributi have not been made From the Internet, you may try out Pine and leave comments by telneting to "demo cac washington edu" and logging in as "pinedemo" To join the Pine mailing list for announcements send a request to "pine-info-request@cac washington.edu"

Pine is very portable and runs on a variety of UNIX machines including DECstations, NeXTs, VAX's and Suns Pine was originally based on Elm, but it has evolved much since, ("Pine Is No-longer Elm")

For further information send e-mail to pine@cac washington edu Pine is the work of Mike Siebel, Mark Crispin, and Laurence Lundblade at the University of Washington

uumail

Uumail is a very old and obsolete precursor to smail 2 5   Included here only because I know that uumail sites still exist   You should not install uumail in new configurations, and existing uumail sites should convert to something more modern

smail 2 5 author The UUCP Mapping Project

Smail 2 5 is a small, simple and hard-coded rule MTA for use on UUCP networks   It understands RFC compliant headers, will generate RFC compliant Internet-style headers, can use domains, aliases, a pathalias UUCP routing database, and is very simple to install For full functionality, you will also want pathalias and a map unpacker The one thing it cannot do by itself is mail-to-pipe and mail-to-file aliasing. For that, you need Zeeff's lmail, deliver or procmail (see note on procmail)

Smail 2.5 has the capability of coalescing addresses into single UUCP transfers, and knows how to query UUCP for the names of UUCP neighbors, and autoroute if necessary

Smail 2.5 has a few bugs that are (usually) pretty rarely seen in operation. There have been a number of patches posted for it, but it is recommended that you do not apply them - some were ill-conceived, buggy in their own right, or conflicting with others. The only patches that I feel safe in recommending is Chip Salzenberg's patches for use with Xenix MICNET - which are unnecessary unless you are in the unfortunate position of having to actually *use* MICNET In particular, do not apply the "mail-to-pipe/file" patches that float around for smail 2 5 This is a major security hole If you're concerned about the bugs, I suggest you wait for smail 2 7.

Smail 2.5 can also be used with sendmail as a UUCP router.

Smail 2.5 was posted in comp sources.unix in 1987, volume 18.

smail 2 7· custodian Greg Woods

Smail 2.5 was originally a dead end. There was a smail 2.6 used internally in some places (no, don't ask for it). Greg Woods is doing a major cleanup and revision of smail 2.[5-6] (with permission of the authors) and will be releasing it (I hope) soon. Smail 2.7 will be, more-or-less, a version of smail 2 5 with all bugs eliminated, and lmail's functionality rolled in. It will probably include the latest pathalias, and possibly a new revision of unpackmaps

Watch this space for late-breaking news ;-)

lmail Author Jon Zeeff

When you install smail 2 5, you link the original /bin/mail (binmail above) to /bin/lmail to perform the task of actually delivering the mail to the user's mailbox (LDA)

Since smail 2.5 was not capable of doing mail-to-pipe and mail-to-file aliasing, Jon Zeeff wrote a replacement lmail that implemented these (along with user mailbox delivery)

Jon's program is okay for casual use, but has some pretty serious bugs Fixed versions are available, but you're probably better off waiting for smail 2 7, or installing deliver or procmail.

smail 3 Author Ronald S Karr* and Landon Curt Noll

Smail3 1 is a domain-capable mail router and delivery program that works in the UUCP zone and on the Internet and that is capable of gatewaying between the two It was written primarily by me (Ronald S Karr) and Landon Curt Noll, with the blessings of the original Smail1 and Smail2 authors

Smail3 supports SMTP, UUCP mail, alias files, forward files, mailing list directories, pathalias files, /etc/hosts files, the domain name system, and can also query uucp for neighboring sites, automatically.

It also supports use of encapsulated SMTP commands for delivery over UUCP connections, which allows batching of multiple messages into a single UUCP transaction, and allows many addresses to be passed with a single message transfer, which can greatly decrease the traffic generated for large mailing lists It is also very simple to configure with a reasonable certainty of correctness

Smail3 includes pathalias and a reliable map unpacker

Rather than using configuration files to resolve addresses based on their syntax, ala sendmail, Smail3 uses a database metaphore for resolving addresses based on their contents. The set of methods that Smail3 uses for resolving local addresses and hosts is configurable and extensible Smail3's methods for parsing addresses are not configurable It is the opinion of the authors that addressing on the Internet and in the UUCP zone has become sufficiently standardized that attempts to allow configurability in this area are now a hindrance to the correct working of the network

Current releases of Smail3 have some problems when operating on the Internet or on local ethernet networks Some of the problems arrise when when the level of traffic gets too high, and result from the fact that Smail3 does not currently limit its usage of CPU resources Additionally, Smail3 is not yet sufficiently intelligent in its management of outgoing SMTP connections As a result, Smail3 does not make effective use of single connections, and cannot use a history of connection failures to alter its behavior These problems are now being addressed.

Questions related to Smail3 are usually discussed in comp.mail misc There are also two discussion mailing lists. To join the mailing lists, send mail to

smail3-users-request@cs athabascau.ca

The current release of Smail3 can be found on uunet, in the directory /usr/spool/ftp/mail. The current release file is smail-3 1 25 tar Z

Smail 3 is covered under the GPL (if it matters)

sendmail Original author Eric Allman

Sendmail is the granddaddy of all intelligent MTA's It can do just about anything It's main problem is that it can do just about anything Modification of sendmail's configuration tables (which is necessary with most vendor-supplied versions) is NOT for novices The language of the sendmail cf is cryptic, but that isn't really the problem (and this problem can be solved by using "EASE", a sendmail cf writing language, or the UIUC IDA kit's configuration file building tools). The problem is that it's extremely difficult to know when the rules you are implementing are the right thing--many sendmail configurations do slightly buggy, or even extremely buggy, things (eg some major mail gateways munge From headers in illegal ways) (The default configurations generated by the UIUC IDA kit are, however, very good at Doing the Right Thing under most, if not all, circumstances.)

Worse, every vendor's version of sendmail is different, and many of their sendmail cf's don't work at all (HPUX is one example of where the sendmail cf is actually pretty sane HP is to be congratulated On the other hand, some vendors, who shall remain nameless, can't even get their sendmail to speak SMTP on a LAN)

There are several versions of sendmail extant in the world. There is no "latest" version If you want to use sendmail, it is strongly recommended that you obtain "IDA sendmail" The IDA version is much more likely to do the right things with mail coming from, or ultimately going to, UUCP sites and is much easier to maintain. IDA sendmail can handle pathalias-style UUCP routing quite well

I am being a bit overly harsh on sendmail If you obtain a good configuration (like the aforementioned HPUX version), or are willing to spend the time to learn it, sendmail will do what you want Well IDA sendmail is STRONGLY recommended The latest version of IDA sendmail is 5 65c, and 5.65d is in beta test. 5 65c is available for FTP from ftp.uu net and uxc cso.uiuc.edu. Paul Pomes, , is controlling the IDA Sendmail releases

Sendmail is discussed in comp mail sendmail.

EASE version 3 5 was posted in volume 25 of comp.sources unix and is available from wuarchive wustl.edu [128 252 135 4] (directory /usenet/comp.sources unix/volume25/ease) and many other c s.u archives.

ZMailer Author Rayan Zachariassen*

ZMailer is intended for gateways or mail servers or other large site environments that have extreme demands on the abilities of the mailer

Code and Design features:

+ Strong limits on host impact
+ Secure design (and hopefully implementation)
+ Natural fit for client/server environments
+ Extremely customizable configuration mechanism.
+ Flexible database interface with support for sorted files, unsorted files, dbm, ndbm, gdbm, nis (yellow pages), dns (BIND resolver), /etc/hosts file, and in-core data
+ Efficient message queue management.
+ Fast binary-transparent SMTP server and client
+ Low-technology implementation

Default configuration file features:

+ Default configuration will work for most sites.
+ Network protocol support for smtp, uucp, bitnet, mail to news
+ An easy way of overriding any external routing information
+ Automatic handling of mailing lists

It is available by anonymous FTP from ftp.cs toronto edu:/pub/zmailer.t or ftp cs toronto edu /distrib/zmailer tar Z

MMDF [reviewed by I Sparry@gdt bath ac uk]

MMDF is a MTA. It works on the principle that you have communications channels, both incoming and outgoing, and it arranges for messages to pass between them

Strong points include
* Ability to turn up and down debugging level on the fly
* Very strong on authentication, and permission checking
* Can block mail based on who it came from, how it got there, who it is going to

It is older than sendmail, simpler than sendmail, and it is a great pity that it was not shipped as standard instead of sendmail

It has one major advantage to people in the UK, in that it knows how to handle mail addresses in our 'correct' format (Most significant part fi e g net uu.uunet), as well as the thing the rest of the world uses -)

The accepted wisdom is that MMDF should be replaced with PP, since PP is the descendent of MMDF We are happy with MMDF, and for many years the UK mail gateways used it

PP Author University College London

PP is a Message Transfer Agent, intended for high volume message switching, protocol conversion, and format conversion It is targeted f use in an operational environment, but may also be useful for investiga Message related applications Good management features are a major aspect of this system PP supports the 1984 and 1988 versions of the CCITT X 400 / ISO 10021 services and protocols. Many existing RFC 822 based protocols are supported, along with RFC 1148 conversion to X 400 PP is an appropriate replacement for MMDF or Sendmail, and also support SMTP and UUCP mail.

For more information contact support@xtel.co uk or xtel@cs.nott ac uk The latest version is PP-6 0, which was posted in comp.sources misc, volume 27

SVR4 mail Author AT&T (description written by Tony Hansen, hansen@pegasus att com)

The System V Release 4 mail system is a domain-capable mail router and delivery program that works in the UUCP zone and on the Internet and that is capable of gatewaying between the two

SVR4 mail supports SMTP, UUCP mail, alias files, forwarding files, mailing list directories, /etc/hosts files, the domain name system, and can also query uucp for neighboring sites, automatically   (System V Release 4 1 also allows batching of multiple messages into a single UUC transaction, and allows many addresses to be passed with a single message transfer, which can greatly decrease the traffic generated for large mailing lists) It is also very simple to configure with a reasonable certainty of correctness.

It also supports mail-to-pipe and mail-to-file

SVR4 mail uses configuration files to resolve addresses based on their syntax, somewhat similar to sendmail, but using regular expressions and a more easily understood syntax The set of methods that SVR4 mail uses for resolving local and remote addresses and hosts is configurable and extensible.

Questions related to SVR4 mail are usually discussed in comp mail misc

SVR4 mail is a standard part of System V Release 4, unfortunately, some vendors have not realized that SVR4 mail is not the same mailer as the SVR3 mail system, and have replaced it with other inferior mail systems

deliver Author Chip Salzenberg*

Deliver allows any user to write a shell script that processes all incoming mail messages for that user The system administrator may also install scripts that process all messages by installing it as the Local Delivery Agent (lmail replacement).

The output of a script is a list of mail addresses, files and programs that should receive the message It has access to each message as it is processed, so the action can be content dependent. The script may also generate automatic replies, like the "vacation" program, or pass along a modified version of the original message.

Deliver can be used to construct mail-based services (e.g automatic mailing list maintenance) It can also be used to filter mail automatically in prearranged ways (e.g encryption and decryption, tossing junk mail, or vacation notices).

Deliver was last posted in comp sources.reviewed, volume 1 The current version is 2 1 09

procmail: Author Stephen R van den Berg*

Can be used to create mail-servers, mailing lists, sort your incoming m into separate folders/files (real convenient when subscribing to one or more mailing lists or for prioritising your mail), preprocess your mail start any programs upon mail arrival (e.g to generate different chimes your workstation for different types of mail) or selectively forward certain incoming mail automatically to someone.

The accompanying formail program enables you to generate autoreplies, s up digests/mailboxes into the original messages, do some very simple header-munging/extraction, or force mail into mail-format (with leading From line)

Procmail was designed to deliver the mail under the worst conditions (file system full, out of swap space, process table full, file table fu missing support files, unavailable executables, it all doesn't matter). Should (in the unlikely event) procmail be unable to deliver your mail somewhere, the mail will bounce back to the sender or reenter the mailq (your choice)

A recent version can be picked up at various comp sources misc archives
The latest version (2 61) can be obtained directly from the ftp-archive
amaru.informatik rwth-aachen.de (137 226 112.31)
as compressed tar file. pub/unix/procmail tar Z <10
or in compressed shar format: pub/unix/procmail 0? Z

[Ed note: there are reports of difficulties integrating procmail with System V and/or smail 2 5. "Not for novices" as one person put it This may have been rectified in later versions of Procmail, but I don't make any guarantees]

pathalias: Author Peter Honeyman

Pathalias reads the UUCP Map Project maps (they need to be extracted from the postings first) and constructs a database containing the minimum cost route to any machine in the maps This database can then be used with any mailer that knows how to search the database (eg smail 2 5, Zmailer?, and some versions of sendmail. Smail 3 comes bundled with pathalias).

There were previous versions of this program. You must use pathalias version 10 (latest version), because some map format changes have been made and only pathalias 10 can parse them
If your pathalias doesn't give a syntax error on

```
    echo "file {foo}" | pathalias
```

It's the new one.

There were other route-generating programs, but all (as far as I know) are very obsolete, and none run as fast as pathalias (still, which can be rather hard on machines with smallish virtual memory or RAM capacities)

pathalias 10 is available from comp.sources unix archives, volume 22 A patch was just released in comp sources unix (vol 25) that addresses an oddity when used with smail (not that I've ever noticed it)

uuhosts Author John Quarterman (?)

The "defacto" standard UUCP Map Project map unpacker Includes a program to arbitrarily view individual map entries Uuhosts implements trojan horse/virus security by running under a "chroot()" system call Uuhosts does not appear to be actively maintained, and the last versions that I have inspected were unable to easily compress the maps (a full set of maps is >6000 blocks), had no provision for automatically running pathalias, and will not work with the newest version of cnews. Further, uuhost's header checking is so picky that the slightest change in the map format will cause uuhosts to reject map updates.

Use of uuhosts now will require some minor hacking - and this hacking will stretch your knowledge of Bourne shell programming

The last edition, "uuhost4" (version 1 69) appears to have been posted in comp.sources unix in volume 3, 1986

Do not be confused by Jan-Piet Mons "uuhost 2 0" program posted in alt sources. This is not a map unpacker It is just a map viewer, and is a subset of the real uuhosts

unpackmaps Author Chris Lewis*

Unpackmaps has a superset of the functionality of uuhosts It obtains its security by doing the map unpacking with a specialized awk script that knows the map article format rather than invoking a shar/shell Compression and pathalias invocation is automatic, correctly takes into account the change date of local configuration files, and will work with the latest Cnews.

The last version of unpackmaps, version 3 2, was posted in comp sources misc in Aug 1991 (volume 22, issue 69) (do a g/NEWSPOOL/s//NEWSSPOOL/ on unpackmaps to fix a botch with cnews)

Unpackmaps 4 0 is being rewritten in C for improved performance and functionality and is currently in beta test It will be appearing soon, possibly in smail 2 7

Zuruck zur MMS Homepage

MAILING LISTS AND BITNET

INTERNET MAILING LISTS

Usenet is not the only forum on the Net. Scores of "mailing lists" represent another way to interact with other Net users. Unlike Usenet messages, which are stored in one central location on your host system's computer, mailing-list messages are delivered right to your e-mail box, unlike Usenet messages.

You have to ask for permission to join a mailing list Unlike Usenet, where your message is distributed to the world, on a mailing list, you send your messages to a central moderator, who either re-mails it to the other people on the list or uses it to compile a periodic "digest" mailed to subscribers

Given the number of newsgroups, why would anybody bother with a mailing list?

Even on Usenet, there are some topics that just might not generate enough interest for a newsgroup, for example, the Queen list, which is all about the late Freddie Mercury's band.

And because a moderator decides who can participate, a mailing list can offer a degree of freedom to speak one's mind (or not worry about net weenies) that is not necessarily possible on Usenet. Several groups offer anonymous postings -- only the moderator knows the real names of people who contribute Examples include 12Step, where people enrolled in such programs as Alcoholics Anonymous can discuss their experiences, and sappho, a list limited to gay and bisexual women.

You can find mailing addresses and descriptions of these lists in the news announce newusers newsgroup with the subject of "Publicly Accessible Mailing Lists " Mailing lists now number in the hundreds, so this posting is divided into three parts

If you find a list to which you want to subscribe, send an e-mail message to

list-request@address

where "list" is the name of the mailing list and "address" is the moderator's e-mail address, asking to be added to the list Include your full e-mail address just in case something happens to your message's header along the way, and ask, if you're accepted, for the address to mail messages to the list

listserver. Inside the message, you tell the listserver what you want, with a series of simple commands

subscribe group Your Name	To subscribe to a list, where "group" is the list name and "Your Name" is your full name, for example: subscribe econet Henry Fielding
unsubscribe group Your Name	To discontinue a group, for example unsubscribe econet Henry Fielding
list global	This sends you a list of all available Bitnet discussion groups. But be careful -- the list is VERY long!
get refcard	Sends you a list of other commands you can use with a listserver, such as commands for retrieving past postings from a discussion group

Each of these commands goes on a separate line in your message (and you can use one or all of them). If you want to get a list of all Bitnet discussion groups, send e-mail to

listserv@bitnic.educom.edu

Leave the "subject:" line blank and use the list global command.

When you subscribe to a Bitnet group, there are two important differences from Usenet.

First, when you want to post a message for others to read in the discussion group, you send a message to the group name at its Bitnet address. Using Econet as an example, you would mail the message to

econet@miamiu.bitnet

Note that this is different from the listserv address you used to subscribe to the group to begin with. Use the listserv address ONLY to subscribe to or unsubscribe from a discussion group. If you use the discussion-group address to try to subscribe or unsubscribe, your message will go out to every other subscriber, many of whom will think unkind thoughts, which they may share with you in an e-mail message).

The second difference relates to sending an e-mail message to the author of a particular posting. Usenet newsreaders such as rn and nn let you do this with one key. But if you hit your R key to respond to a discussion-group message, your message will go to the listserver,

BITNET

As if Usenet and mailing lists were not enough, there are Bitnet "discussion groups" or "lists "

Bitnet is an international network linking colleges and universities, but it uses a different set of technical protocols for distributing information from the Internet or Usenet It offers hundreds of discussion groups, comparable in scope to Usenet newsgroups

One of the major differences is the way messages are distributed Bitnet messages are sent to your mailbox, just as with a mailing list. However, where mailing lists are often maintained by a person, all Bitnet discussion groups are automated -- you subscribe to them through messages to a "listserver" computer This is a kind of robot moderator that controls distribution of messages on the list In many cases, it also maintains indexes and archives of past postings in a given discussion group, which can be handy if you want to get up to speed with a discussion or just search for some information related to it.

Many Bitnet discussion groups are now "translated" into Usenet form and carried through Usenet in the bit listserv hierarchy In general, it's probably better to read messages through Usenet if you can It saves some storage space on your host system's hard drives

If 50 people subscribe to the same Bitnet list, that means 50 copies of each message get stored on the system, whereas if 50 people read a Usenet message, that's still only one message that needs storage on the system It can also save your sanity if the discussion group generates large numbers of messages Think of opening your e-mailbox one day to find 200 messages in it -- 199 of them from a discussion group and one of them a "real" e-mail message that's important to you

Subscribing and canceling subscriptions is done through an e-mail message to the listserver computer. For addressing, all listservers are known as "listserv" (yep) at some Bitnet address This means you will have to add " bitnet" to the end of the address, if it's in a form like this listserv@miamiu For example, if you have an interest in environmental issues, you might want to subscribe to the Econet discussion group To subscribe, send an e-mail message to

listserv@miamiu bitnet

Some Bitnet listservers are also connected to the Internet, so if you see a listserver address ending in " edu", you can e-mail the listserver without adding " bitnet" to the end

Always leave the "subject " line blank in a message to a and from there to everybody else on the list! This can prove embarrassing to you and annoying to others To make sure your message goes just to the person who wrote the posting, take down his e-mail address from the posting and then compose a brand-new message. Remember, also, that if you see an e-mail address like IZZY@INDYVMS, it's a Bitnet address

Two Bitnet lists will prove helpful for delving further into the network NEW-LIST tells you the names of new discussion groups To subscribe, send a message to listserv@ndsuvm1 bitnet

sub NEW-LIST Your Name

INFONETS is the place to go when you have questions about Bitnet It is also first rate for help on questions about all major computer networks and how to reach them. To subscribe, send e-mail to info-nets-request@think com

sub INFONETS Your Name

Both of these lists are also available on Usenet, the former as bit.listserv new-list, the latter as bit listserv infonets (sometimes bit.listserv info-nets)

Indian Internet Service Providers

1 ERNET Connectivity - Options and Mechanisms

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ERNET
Services
Connectivity Options
Subscription
Mode of Payment

ERNET at Present

ERNET has over 300 organisations connected within India and neighbouring countries like Nepal, and about 15000- 20000 users have access to various services available on the network These institutions are mainly academic and research institutions, Non Government Organisations and to a limited extent private and international organisations. ERNET has access to about 120 networks in other countries through global Internet which has an estimated 3 million hosts and 20 million users all over the world today

ERNET Backbone Sites

ERNET is supported by the following backbone sites which enable organisations located at different geographical locations to access various services

Department of Electronics, New Delhi
National Centre for Software Technology, Bombay
Inter University Centre for Astronomy and Astrophysics, Pune
Variable Energy Cyclotron Centre, Calcutta
Indian Institute of Technology, Kanpur
Central University, Hyderabad

ERNET Services

The following services are presently available on the network but access to these services depends on nature of connectivity and technically on telecom facilities between the site and the nearest ERNET backbone site

E-mail, USENET News

Possible through dial-up or STD lines with UNIX or DOS systems or LANs. In order to have access to news groups, suitable public domain software has to be installed in local system

File transfer, Remote login, Gopher, Wais, Archie, WWW, Mosaic

While ASCII (text) files of limited size can be transferred through e-mail, this would normally require full IP connectivity However, limited binary file transfer is possible using UU Encode and UU Decode through e-mail only. These require full IP connectivity or a remote account in one of the ERNET backbone site machine

Database Access

It also requires full IP services or access to remote account in ERNET backbone site machine Presently, the data bases in India are limited, e,g , IIT Kanpur Library Automation System, Bombay Library Network, IIT Kharagpur Library etc But the remote access to computing resources and access to public data bases available in Internet in other countries, or commercial data bases like DIALOG come under this category of services.

Directory Service

X 500 based directory service is available on ERNET which gives information about users and hosts. However, extent of entries in this directory is limited at present and it also requires IP access/remote user account

FAX Mail

This represents gateway to facsimile through e-mail This service is currently limited but it would be widely available in near future when facsimile servers are in place over the network.

Options for Connectivity

There are three categories of ERNET connectivity which are based on the range of services provided and the annual subscription charges have been decided in proportion to approximate traffic generated by the node. Depending on the number of users and the services offered, the traffic pattern could be approximated These options are the following,

Option 1.

Access through a dial-up telephone line (local or STD)

The site would access the nearest ERNET backbone site using a dial-up line and e-mail and news group services can be used The subscriber should have the following equipment/facilities in order to make use of these services,

Telephone connection (can be shared with telephone instrument)

A high speed modem (14 4 Kbps), Cost approx Rs 15,000- 30,000

A PC running DOS, or a PC 386/486 machine running UNIX family operating system, or a Local area Network depending on the size of the institution

In addition to the above, the communication utility UUCP is supplied with UNIX system and is available free of cost in public domain for other popular systems like-DOS and VMS, and should be installed in the local system The advantage of this option is to start functioning without much preparations and the system can be instructed to transfer messages in the nights when STD calls are cheapest For local dial-up lines, dial-up SLIP or PPP (Point-to-Point Protocol) can be used to get full IP connection

Option 2

Access through a leased line (analog or digital) This option would facilitate the users to access full range of IP services using the following equipment/facilities

A leased line between the site and the nearest ERNET backbone

A pair of high performance modem (9 6 Kbps) for analog lines costing approx

Rs 40,000 each, or a CSU/DSU (pair) for digital leased line costing about US $ 2000 per pair

PC 386/486 system running UNIX family operating system, and TCP/IP protocols with UNIX system

A router costing about US $ 3000 to provide access to LANs interconnected at users site

The main advantage of this option is the availability of a cost-effective link and economy of on-line access to network resources. In case of a single machine at users premises, network access can be provided using serial line protocol called SLIP but a router must be deployed to interconnect a number of machines connected through TCP/IP

Option 3.

Access through VSAT Terminal While involving some initial capital investment, this option is most suited in many cases because it provides upto 64 kbps digital connectivity and enables users to access all IP services reliably The equipment/facilities required are the following,

A VSAT Terminal installation, costing 10 lakhs and annual maintenance contract to the tune of Rs. 50,000 approx

A router costing about US $ 3000

High performance modem V 32 bis, Cost Rs 15,000- 20,000 for each dial-in port.

A system or Workstation running UNIX operating system with TCP/IP, or a cluster of such systems.

This option is highly recommended for large organisations or sites requiring reliable connection specially when the distance to ERNET backbone site is large The most attractive advantage of this scheme is high reliability because down-time for leased lines can be high Moreover, this is the only feasible option for remote areas due to the non-availability of leased lines

Subscription Schemes

The costs indicated in the above options towards equipment/ communications facilities must be borne by the institutions themselves However, DoE or any other backbone site can help you with the selection of right type of equipment and their installation at your site The annual subscription schemes of ERNET can vary depending upon the requirements of the organisation and are meant to recover infrastructural and other operating costs The following schemes of annual subscription are offered,

Scheme 1 Rs 1 lakh per annum

It is for those organisation whose expected average traffic per day is upto 200 Kbyte With the provision of a leased line, full range of IP services including remote access to servers can be also offered without any extra payment. If the node is in the same city as the back bone site, it is possible to maintain a remote account in backbone site system using dial-up line Connectivity option 1 (with or without STD facility) is covered in this scheme

Scheme 2 Rs 2 lakhs per annum

It cover the organisations whose average traffic per day is upto 1 Mbyte Like first scheme, it also has the advantage of full IP services Connectivity options 1 (with local dial-up line), 2 (with analog leased line) and option 3 are covered in this scheme

Scheme 3· Rs 5 lakhs per annum

Organisations whose daily average traffic is of the order of 5 Mbps, would be covered in this scheme. This scheme covers option 2 (for both analog and digital lines) and option 3 with VSAT terminal The subscription amount is telescopic in respect of traffic which is a good incentive for organisations capable of generating such large volumes of traffic.

Scheme 4 Group subscription

This is a special scheme offered to a large group of organisations with common interests and single point of payment at subscription rate of Rs 25,000 per year for each site The range of services is largely restricted to e-mail However, the option also exists for any site to opt for either scheme 1 or 2 to have access to a wider range of services

Mode of Payment

The application can be sent to the Department of Electronics along with a demand draft of the amount in accordance with the connectivity options indicated above The draft should be drawn in favour of National Centre of Software Technology, Bombay.

For further guidance and help please contact

Mr S Ramakrishnan
Director
Phone 011-436 1251
Fax 011-436 2924
E-mail ramki@doe ernet in

Dr S P Nawathe
Additional Director
Phone 011-436 3071
Fax. 011-4362924
E-mail nawathe@doe ernet.in

Snail Mail

ERNET Project
Department of Electronics
Electronics Niketan
6. C G O Complex.
Lodhi Road.
New Delhi 110 003

2 VSNL's Gateway Internet Access Service

From August 15 1995. VSNL has started Internet access provider services Though promised a lot many things. in this phase a few of them (like Rs 500/- per annum student's access) have not yet commenced They are promised to be started from December this year The most attractive feature of the service is its tariff structure which is not only reasonable but is flat and devoid of hidden charges (At least it looks so on paper)

NEWSFLASH

(Times of India. Business Times, Friday September 22)

Videsh Sanchar Nigam Limited (VSNL) has appointed C-Net Communications and Office Automation Services Ltd as marketing agents for Internet and other value added services in Bombay. reports Business Times Bureau Besides marketing the Internet connection. the company will also be setting up Internet communication centres to provide the services to the general public who cannot afford to have their own Internet or E-Mail connection One such centre has already been opened for the first time in India. at Chakala. Bombay

The GIAS Tariff Structure

Registration Fees (One time)

I) Dial-up
  Students Nil
  Others Rs 1,000/-

ii) Leased Line subscribers Rs 10,000/-

Installation Charges (One time)

2 4kbps. 9 6kbps leased lines . Rs 2,000/-

64kbps, 128kbps Rs 10,000/-

Annual Charges (in Rs) (These are just the charges to be paid for subscription to GIAS These do not include the telephone charges incurred in using dial-up services or leased line rental charges) Click here for information on leased circuits

	Dial-up		Leased Line			
	2 4kbps	9 6kbps	2 4kpbs	9 6kbps	64kbps	128kbps
Students	500	-	-	-	-	-
Professionals	5 000	5,000	-	-	-	-
Non commercial	9,000	15,000	60 000	240,000	600,000	1000 000
Registered s/w exporters (100% EOU)	12,000	20,000	120,000	480,000	1200,000	2000,000
Commercial Organisations	15,000	25,000	150,000	600,000	1500,000	2500,000
Network connection to email/Internet service providers	-	-	-	710,000	1800,000	3000,000

Charges are in Rs/year

Note

The students scheme has not started yet Its promised to start from December 1995
As of now, its not possible for commercial service providers to avail of this service, as even though VSNL is allowing subscription, DoT is not clear on its policies and would not allow such organisations to have leased lines

For dialup users its maximum 500 hours per year

Types of Services

The "shell" account You get an account on one the VSNL machines You get an email address You can dialup and log in to the shell account and use email, ftp etc These are text only accounts Its not clear whether text only web-browsing would be possible through these accounts You also get 512kb of disk space On login you get a menu of all available services Users cannot break out of this menu and go to the unix shell to do unix-things
The TCP/IP account Your machine gets an IP address Full Internet access including graphics for web

Accessing through other networks like "Inet" - I am not very clear on this except that you can probably connect to the server through Inet instead of making STD call

The services has currently been started in the four metro cities (Bombay, Calcutta, Delhi, Madras, Pune, Bangalore, Lucknow, Kanpur) and will be commenced in 30 more cities in next phase GIAS network is connected to their provider by multiple 64kbps lines which are to be upgraded to T1/E1 links soon

Whom to Contact

VSNL Customer Service Centres
  Bombay (022) 2624001, 2624020, 2655031
  Madras. (044) 5611994, 566740, 568696
  Bangalore. (080) 5587533, 5587420
  New Delhi: (011) 3747337, 3746769
  Calcutta (033) 2253266, 2253218
  Pune (0212) 666744, 660562
GIAS Dial-up Access Telephones
  Bombay (022) 2659395, 2659385, 2659045
  New Delhi (011) 3732964-71, 3733795-99, 3739340-42
  Calcutta (033) 3215983, 3215984
  Madras (044) 567841, 568035, 568693, 568753, 568698
GIAS Help-Desk contact email addresses and telephone numbers
  Bombay· helpdesk@giasbm01 vsnl net in, 2624020, 2622250
  New Delhi helpdesk@giasdl01 vsnl net in; 3747310, 3745315
  Calcutta helpdesh@giascl01 vsnl net in, 3218766, 3216201
  Madras helpdesk@giasmd01 vsnl net in, 566740, 564025

TERI
Workshop on
Information Handling and Dissemination in Energy and Environment

Big Dummy's Guide to the Internet, v.2.2

March 5–7 1997

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Appendix B Electronic Frontier Foundation Information

Foreword

By Mitchell Kapor,
Co-founder, Electronic Frontier Foundation.

Welcome to the World of the Internet

The Electronic Frontier Foundation (EFF) is proud to have sponsored the production of the Big Dummy's Guide to the Internet EFF is a nonprofit organization based in Washington, D C , dedicated to ensuring that everyone has access to the newly emerging communications technologies vital to active participation in the events of our world As more and more information is available online, new doors open up for those who have access to that information Unfortunately, unless access is broadly encouraged, individuals can be disenfranchised and doors can close, as well The Big Dummy's Guide to the Internet was written to help open some doors to the vast amounts of information available on the world's largest network, the Internet

The spark for the Big Dummy's Guide to the Internet was ignited in a few informal conversations that included myself and Steve Cisler of Apple Computer, Inc , in June of 1991 With the support of Apple Computer, EFF engaged Adam Gaffin to write the book and actually took on the project in September of 1991

The idea was to write a guide to the Internet for people who had little or no experience with network communications We intended to post this guide to the Net in ASCII and HyperCard formats and to give it away on disk, as well as have a print edition available. We have more than realized our goal Individuals from as geographically far away as Germany, Italy, Canada, South Africa, Japan, Scotland, Norway, and Antarctica have all sent electronic mail to say that they downloaded the Big Dummy's Guide to the Internet The guide is now available in a wide array of formats, including ACSCII text, HyperCard, World Wide Web, PostScript and AmigaGuide And the guide will be published in a printed format by MIT Press in June of 1994.

EFF would like to thank author Adam Gaffin for doing a terrific job of explaining the Net in such a nonthreatening way We'd also like to thank the folks at Apple, especially Steve Cisler of the Apple Library, for their support of our efforts to bring this guide to you.

We invite you to join with EFF in our fight to ensure that equal access to the networks and free speech are protected in newly emerging technologies We are a membership organization, and through donations like yours, we can continue to sponsor important projects to make communications easier Information about the Electronic Frontier Foundation and some of the work that we do can be found at the end of this book.

We hope that the Big Dummy's Guide to the Internet helps you learn about whole new worlds, where new friends and experiences are sure to be yours. Enjoy!

Mitch Kapor
Chairman of the Board
Electronic Frontier Foundation
mkapor@eff.org

For comments, questions, or requests regarding EFF or the Big Dummy's Guide to the Internet, send a note to ask@eff.org.

Preface

By Adam Gaffin,
Senior Writer, Network World, Framingham, Mass.

Welcome to the Internet! You're about to start a journey through a unique land without frontiers, a place that is everywhere at once -- even though it exists physically only as a series of electrical impulses. You'll be joining a growing community of millions of people around the world who use this global resource on a daily basis

With this book, you will be able to use the Internet to.

= Stay in touch with friends, relatives and colleagues around the world, at a fraction of the cost of phone calls or even air mail.

= Discuss everything from archaeology to zoology with people in several different languages.

= Tap into thousands of information databases and libraries worldwide.

= Retrieve any of thousands of documents, journals, books and computer programs.

= Stay up to date with wire-service news and sports and with official weather reports

= Play live, "real time" games with dozens of other people at once

Connecting to "the Net" today, takes something of a sense of adventure, a willingness to learn and an ability to take a deep breath every once in awhile Visiting the Net today is a lot like journeying to a foreign country There are so many things to see and do, but everything at first will seem so, well, foreign

When you first arrive, you won't be able to read the street signs. You'll get lost If you're unlucky, you may even run into some locals who'd just as soon you went back to where you came from If this weren't enough, the entire country is constantly under construction; every day, it seems like there's something new for you to figure out.

Fortunately, most of the locals are actually friendly. In fact, the Net actually has a rich tradition of helping out visitors and newcomers. Until very recently, there were few written guides for ordinary people, and the Net grew largely through an "oral" tradition in which the old-timers helped the newcomers.

So when you connect, don't be afraid to ask for help You'll be surprised at how many people will lend a hand!

Without such folks, in fact, this guide would not be possible My thanks to all the people who have written with suggestion, additions and corrections since the Big Dummy's Guide first appeared on the Internet in 1993.

Special thanks go to my loving wife Nancy. I would also like to thank the following people, who, whether they know it or not, provided particular help.

Rhonda Chapman, Jim Cocks, Tom Czarnik, Christopher Davis, David DeSimone, Jeanne deVoto, Phil Eschallier, Nico Garcia, Joe Granrose, Joerg Heitkoetter, Joe Ilacqua, Jonathan Kamens, Peter Kaminski, Thomas A Kreeger, Stanton McCandlish, Leanne Phillips, Nancy Reynolds, Helen Trillian Rose, Barry Shein, Jennifer "Moira" Smith, Gerard van der Leun and Scott Yanoff

If you have any suggestions or comments on how to make this guide better, I'd love to hear them You can reach me via e-mail at adamg@world.std com

Boston, Mass., February, 1994

Chapter 1· SETTING UP AND JACKING IN

1 1 READY, SET

The world is just a phone call away With a computer and modem, you'll be able to connect to the Internet, the world's largest computer network (and if you're lucky, you won't even need the modem; many colleges and companies now give their students or employees direct access to the Internet)

The phone line can be your existing voice line -- just remember that if you have any extensions, you (and everybody else in the house or office) won't be able to use them for voice calls while you are connected to the Net

A modem is a sort of translator between computers and the phone system It's needed because computers and the phone system process and transmit data, or information, in two different, and incompatible ways Computers "talk" digitally; that is, they store and process information as a series of discrete numbers The phone network relies on analog signals, which on an oscilloscope would look like a series of waves When your computer is ready to transmit data to another computer over a phone line, your modem converts the computer numbers into these waves (which sound like a lot of screeching) -- it "modulates" them In turn, when information waves come into your modem, it converts them into numbers your computer can process, by "demodulating" them

Increasingly, computers come with modems already installed If yours didn't, you'll have to decide what speed modem to get Modem speeds are judged in "bps rate" or bits per second One bps means the modem can transfer roughly one bit per second, the greater the bps rate, the more quickly a modem can send and receive information. A letter or character is made up of eight bits

You can now buy a 2400-bps modem for well under $60 -- and most now come with the ability to handle fax messages as well At prices that now start around $150, you can buy a modem that can transfer data at 14,400 bps (and often even faster, using special compression techniques) If you think you might be using the Net to transfer large numbers of files, a faster modem is always worth the price It will dramatically reduce the amount of time your modem or computer is tied up transferring files and, if you are paying for Net access by the hour, will save you quite a bit in online charges

Like the computer to which it attaches, a modem is useless without software to tell it how to work. Most modems today come with easy-to-install software. Try the program out If you find it difficult to use or understand, consider a trip to the local software store to find a better program. You can spend several hundred dollars on a communications program, but unless you have very specialized needs, this will be a waste of money, as there are a host of excellent programs available for around $100 or less. Among the basic features you want to look for are a choice of different "protocols" (more on them in a bit) for transferring files to and from the Net and the ability to write "script" or "command" files that let you automate such steps as logging into a host system.

When you buy a modem and the software, ask the dealer how to install and use them Try out the software if you can. If the dealer can't help you, find another dealer You'll not only save yourself a lot of frustration, you'll also have practiced the prime Internet directive "Ask People Know."

To fully take advantage of the Net, you must spend a few minutes going over the manuals or documentation that comes with your software There are a few things you should pay special attention to· uploading and downloading; screen capturing (sometimes called "screen dumping"); logging, how to change protocols; and terminal emulation It is also essential to know how to convert a file created with your word processing program into "ASCII" or "text" format, which will let you share your thoughts with others across the Net

Uploading is the process of sending a file from your computer to a system on the Net Downloading is retrieving a file from somewhere on the Net to your computer. In general, things in cyberspace go "up" to the Net and come "down" to you.

Chances are your software will come with a choice of several "protocols" to use for these transfers These protocols are systems designed to ensure that line noise or static does not cause errors that could ruin whatever information you are trying to transfer. Essentially, when using a protocol, you are transferring a file in a series of pieces After each piece is sent or received, your computer and the Net system compare it If the two pieces don't match exactly, they transfer it again, until they agree that the information they both have is identical If, after several tries, the information just doesn't make it across, you'll either get an error message or your screen will freeze In that case, try it again If, after five tries, you are still stymied, something is wrong with a) the file, b) the telephone line, c) the system you're connected to, or d) your own computer

From time to time, you will likely see messages on the Net that you want to save for later viewing -- a recipe, a particularly witty remark, something you want to write your congressman about, whatever This is where screen capturing and logging come in

When you tell your communications software to capture a screen, it opens a file in your computer (usually in the same directory or folder used by the software) and "dumps" an image of whatever happens to be on your screen at the time.

Logging works a bit differently. When you issue a logging command, you tell the software to open a file (again, usually in the same directory or folder as used by the software) and then give it a name Then, until you turn off the logging command, everything that scrolls on your screen is copied into that file, sort of like recording on videotape. This is useful for capturing long documents that scroll for several pages -- using screen capture, you would have to repeat the same command for each new screen

Terminal emulation is a way for your computer to mimic, or emulate, the way other computers put information on the screen and accept commands from a keyboard. In general, most systems on the Net use a system called VT100 Fortunately, almost all communications programs now on the market support this system as well -- make sure yours does

You'll also have to know about protocols. There are several different ways for computers to transmit characters. Fortunately, there are only two protocols that you're likely to run across: 8-1-N (which stands for "8 bits, 1 stop bit, no parity" -- yikes!) and 7-1-E (7 bits, 1 stop bit, even parity)

In general, Unix-based systems use 7-1-E, while MS-DOS-based systems use 8-1-N What if you don't know what kind of system you're connecting to? Try one of the settings If you get what looks like gobbledygook when you connect, you may need the other setting If so, you can either change the setting while connected, and then hit enter, or hang up and try again with the other setting It's also possible your modem and the modem at the other end can't agree on the right bps rate If changing the protocols doesn't work, try using another bps rate (but no faster than the one listed for your modem). Don't worry, remember, you can't break anything! If something looks wrong, it probably is wrong Change your settings and try again. Nothing is learned without trial, error and effort

There are the basics. Now on to the Net!

1 2 GO!

Once, only people who studied or worked at an institution directly tied to the Net could connect to the world. Today, though, an ever-growing number of "public-access" systems provide access for everybody These systems can now be found in several states, and there are a couple of sites that can provide access across the country

There are two basic kinds of these host systems The more common one is known as a UUCP site (UUCP being a common way to transfer information among computers using the Unix operating system) and offers access to international electronic mail and conferences.

However, recent years have seen the growth of more powerful sites that let you tap into the full power of the Net. These Internet sites not only give you access to electronic mail and conferences but to such services as databases, libraries and huge file and program collections around the world. They are also fast -- as soon as you finish writing a message, it gets zapped out to its destination.

Some sites are run by for-profit companies; others by non-profit organizations. Some of these public-access, or host, systems, are free of charge. Others charge a monthly or yearly fee for unlimited access. And a few charge by the hour. Systems that charge for access will usually let you sign up online with a credit card Some also let you set up a billing system

But cost should be only one consideration in choosing a host system, especially if you live in an area with more than one provider Most systems let you look around before you sign up What is the range of each of their services? How easy is each to use? What kind of support or help can you get from the system administrators?

The last two questions are particularly important because many systems provide no user interface at all; when you connect, you are dumped right into the Unix operating system. If you're already familiar with Unix, or you want to learn how to use it, these systems offer phenomenal power -- in addition to Net access, most also let you tap into the power of Unix to do everything from compiling your own programs to playing online games

But if you don't want to have to learn Unix, there are other public-access systems that work through menus (just like the ones in restaurants, you are shown a list of choices and then you make your selection of what you want), or which provide a "user interface" that is easier to figure out than the ever cryptic Unix

If you don't want or need access to the full range of Internet services, a UUCP site makes good financial sense. They tend to charge less than commercial Internet providers, although their messages may not go out as quickly

Some systems also have their own unique local services, which can range from extensive conferences to large file libraries

1 3 PUBLIC-ACCESS INTERNET PROVIDERS

When you have your communications program dial one of these host systems, one of two things will happen when you connect. You'll either see a lot of gibberish on your screen, or you'll be asked to log in. If you see gibberish, chances are you have to change your software's parameters (to 7-1-E or 8-1-N as the case may be). Hang up, make the change and then dial in again.

When you've connected, chances are you'll see something like this:

```
Welcome to THE WORLD
Public Access UNIX for the '90s
Login as 'new' if you do not have an account

login.
```

That last line is a prompt asking you to do something. Since this is your first call, type

```
new
```

and hit enter. Often, when you're asked to type something by a host system, you'll be told what to type in quotation marks (for example, 'new'). Don't include the quotation marks. Repeat. Don't include the quotation marks.

What you see next depends on the system, but will generally consist of information about its costs and services (you might want to turn on your communication software's logging function, to save this information). You'll likely be asked if you want to establish an account now or just look around the system.

You'll also likely be asked for your "user name." This is not your full name, but a one-word name you want to use while online. It can be any combination of letters or numbers, all in lower case. Many people use their first initial and last name (for example, "jdoe"), their first name and the first letter of their last name (for example, "johnd"); or their initials ("jxd"). Others use a nickname. You might want to think about this for a second, because this user name will become part of your electronic-mail address (see chapter 2 for more on that). The one exception are the various Free-Net systems, all of which assign you a user name consisting of an arbitrary sequence of letters and numbers.

You are now on the Net. Look around the system. See if there are any help files for you to read. If it's a menu-based host system, choose different options just to see what happens. Remember: You can't break anything. The more you play, the more comfortable you'll be.

What follows is a list of public-access Internet sites, which are computer systems that offer access to the Net. All offer international e-mail and Usenet (international conferences). In addition, they offer.

FTP. File-transfer protocol -- access to hundreds of file libraries (everything from computer software to historical documents to song lyrics). You'll be able to transfer these files from the Net to your own computer

Telnet Access to databases, computerized library card catalogs, weather reports and other information services, as well as live, online games that let you compete with players from around the world

Additional services that may be offered include

WAIS: Wide-area Information Server; a program that can search dozens of databases in one search

Gopher: A program that gives you easy access to dozens of other online databases and services by making selections on a menu You'll also be able to use these to copy text files and some programs to your mailbox

IRC Internet Relay Chat, a CB simulator that lets you have live keyboard chats with people around the world

However, even on systems that do not provide these services directly, you will be able to use a number of them through telnet (see Chapter 6). In the list that follows, systems that let you access services through menus are noted; otherwise assume that when you connect, you'll be dumped right into Unix (a.k a MS-DOS with a college degree). Several of these sites are available nationwide through national data networks such as the CompuServe Packet Network and SprintNet

Please note that all listed charges are subject to change Many sites require new or prospective users to log on a particular way on their first call. this list provides the name you'll use in such cases

1 4 IF YOUR TOWN HAS NO DIRECT ACCESS

If you don't live in an area with a public-access site, you'll still be able to connect to the Net Several services offer access through national data networks such as the CompuServe Packet Network and

SprintNet, which have dozens, even hundreds of local dial-in numbers across the country These include Holonet in Berkeley, Calf., Portal in Cupertino, Calf., the WELL in Sausalito, Calf., Dial 'N CERF in San Diego, Calf., the World in Brookline, Mass , and Michnet in Ann Arbor, Mich. Dial 'N CERF offers access through an 800 number. Expect to pay from $2 to $12 an hour to use these networks, above each provider's basic charges The exact amount depends on the network, time of day and type of modem you use For more information, contact the above services.

Four other providers deliver Net access to users across the country

Delphi, based in Cambridge, Mass , is a consumer-oriented network much like CompuServe or America Online -- only it now offers subscribers access to Internet services Delphi charges· $3 a month for Internet access, in addition to standard charges These are $10 a month for four hours of off-peak (non-working hours) access a month and $4 an hour for each additional hour or $20 for 20 hours of access a month and $1 80 an hour for each additional hour For more information, call (800) 695-4005

BIX (the Byte Information Exchange) offers FTP, Telnet and e-mail access to the Internet as part of their basic service Owned by the same company as Delphi, it also offers 20 hours of access a month for $20 For more information, call (800) 695-4775

PSI, based in Reston, Va., provides nationwide access to Internet services through scores of local dial-in numbers to owners of IBM and compatible computers PSILink which includes access to e-mail, Usenet and ftp, costs $29 a month, plus a one-time $19 registration fee Special software is required, but is available free from PSI PSI's Global Dialup Service provides access to telnet for $39 a month plus a one-time $39 set-up fee For more information, call (800) 82PSI82 or (703) 620-6651

NovX Systems Integration, based in Seattle, Washington, offers full Internet access through an 800 number reachable across the United States. There is a $24 95 setup fee, in addition to a monthly fee of $19.95 and a $10 5 hourly charge. For more information, call (206) 447-0800

1 5 NET ORIGINS

In the 1960s, researchers began experimenting with linking computers to each other and to people through telephone hook-ups, using funds from the U S Defense Department's Advanced Research Projects Agency (ARPA).

ARPA wanted to see if computers in different locations could be linked using a new technology known as packet switching. This technology, in which data meant for another location is broken up into little pieces, each with its own "forwarding address" had the promise of letting several users share just one communications line. Just as important, from ARPA's viewpoint, was that this allowed for creation of networks that could automatically route data around downed circuits or computers ARPA's goal was not the creation of today's international computer-using community, but development of a data network that could survive a nuclear attack

Previous computer networking efforts had required a line between each computer on the network, sort of like a one-track train route. The packet system allowed for creation of a data highway, in which large numbers of vehicles could essentially share the same lane Each packet was given the computer equivalent of a map and a time stamp, so that it could be sent to the right destination, where it would then be reassembled into a message the computer or a human could use.

This system allowed computers to share data and the researchers to exchange electronic mail, or e-mail. In itself, e-mail was something of a revolution, offering the ability to send detailed letters at the speed of a phone call

As this system, known as ARPANet, grew, some enterprising college students (and one in high school) developed a way to use it to conduct online conferences These started as science-oriented discussions, but they soon branched out into virtually every other field, as people recognized the power of being able to "talk" to hundreds, or even thousands, of people around the country

In the 1970s, ARPA helped support the development of rules, or protocols, for transferring data between different types of computer networks These "internet" (from "internetworking") protocols made it possible to develop the worldwide Net we have today that links all sorts of computers across national boundaries By the close of the 1970s, links developed between ARPANet and counterparts in other countries. The world was now tied together in a computer web.

In the 1980s, this network of networks, which became known collectively as the Internet, expanded at a phenomenal rate Hundreds, then thousands, of colleges, research companies and government agencies began to connect their computers to this worldwide Net Some enterprising hobbyists and companies unwilling to pay the high costs of Internet access (or unable to meet stringent government regulations for access) learned how to link their own systems to the Internet, even if "only" for e-mail and conferences Some of these systems began offering access to the public Now anybody with a computer and modem -- and persistence -- could tap into the world

In the 1990s, the Net continues to grow at exponential rates Some estimates are that the volume of messages transferred through the Net grows 20 percent a month. In response, government and other users have tried in recent years to expand the Net itself. Once, the main Net "backbone" in the U.S moved data at 56,000 bits per second. That proved too slow for the ever increasing amounts of data being sent over it, and in recent years the maximum speed was increased to 1.5 million and then 45 million bits per second. Even before the Net was able to reach that latter speed, however, Net experts were already figuring out ways to pump data at speeds of up to 2 billion bits per second -- fast enough to send the entire Encyclopedia Britannica across the country in just one or two seconds Another major change has been the development of commercial services that provide internetworking services at speeds comparable to those of the government system In fact, by mid-1994, the U.S. government will remove itself from any day-to-day control over the workings of the Net, as regional and national providers continue to expand.

1 6 HOW IT WORKS

The worldwide Net is actually a complex web of smaller regional networks To understand it, picture a modern road network of trans-continental superhighways connecting large cities. From these large cities come smaller freeways and parkways to link together small towns, whose residents travel on slower, narrow residential ways

The Net superhighway is the high-speed Internet. Connected to this are computers that use a particular system of transferring data at high speeds In the U S , the major Internet "backbone" theoretically can move data at rates of 45 million bits per second (compare this to the average home modem, which has a top speed of roughly 9,600 to 14,400 bits per second).

Connected to the backbone computers are smaller networks serving particular geographic regions, which generally move data at speeds around 1 5 million bits per second

Feeding off these in turn are even smaller networks or individual computers

Unlike with commercial networks such as CompuServe or Prodigy, there is no one central computer or computers running the Internet -- its resources are to be found among thousands of individual computers. This is both its greatest strength and its greatest weakness The approach means it is virtually impossible for the entire Net to crash at once -- even if one computer shuts down, the rest of the network stays up. The design also reduces the costs for an individual or organization to get onto the network. But thousands of connected computers can also make it difficult to navigate the Net and find what you want -- especially as different computers may have different commands for plumbing their resources It is only recently that Net users have begun to develop the sorts of navigational tools and "maps" that will let neophytes get around without getting lost

Nobody really knows how many computers and networks actually make up this Net Some estimates say there are now as many as 5,000 networks connecting nearly 2 million computers and more than 15 million people around the world. Whatever the actual numbers, however, it is clear they are only increasing

The Net is more than just a technological marvel It is human communication at its most fundamental level. The pace may be a little quicker when the messages race around the world in a few seconds, but it's not much different from a large and interesting party You'll see things in cyberspace that will make you laugh; you'll see things that will anger you You'll read silly little snippets and new ideas that make you think. You'll make new friends and meet people you wish would just go away

Major network providers continue to work on ways to make it easier for users of one network to communicate with those of another Work is underway on a system for providing a universal "white pages" in which you could look up somebody's electronic-mail address, for example This connectivity trend will likely speed up in coming years as users begin to demand seamless network access, much as telephone users can now dial almost anywhere in the world without worrying about how many phone companies actually have to connect their calls.

And today, the links grow ever closer between the Internet and such commercial networks as CompuServe and Prodigy, whose users can now exchange electronic mail with their Internet friends Some commercial providers, such as Delphi and America Online, are working to bring their subscribers direct access to Internet services.

And as it becomes easier to use, more and more people will join this worldwide community we call the Net

Being connected to the Net takes more than just reading conferences and logging messages to your computer, it takes asking and answering questions, exchanging opinions -- getting involved

If you choose to go forward, to use and contribute, you will become a citizen of Cyberspace If you're reading these words for the first time, this may seem like an amusing but unlikely notion -- that one could "inhabit" a place without physical space But put a mark beside these words Join the Net and actively participate for a year. Then re-read this passage It will no longer seem so strange to be a "citizen of Cyberspace." It will seem like the most natural thing in the world

And that leads to another fundamental thing to remember:

You can't break the Net!

As you travel the Net, your computer may freeze, your screen may erupt into a mass of gibberish You may think you've just disabled a million-dollar computer somewhere -- or even your own personal computer Sooner or later, this feeling happens to everyone -- and likely more than once But the Net and your computer are hardier than you think, so relax You can no more break the Net than you can the phone system If something goes wrong, try again If nothing at all happens, you can always disconnect If worse comes to worse, you can turn off your computer Then take a deep breath And dial right back in Leave a note for the person who runs the computer to which you've connected to ask for advice Try it again Persistence pays.

Stay and contribute The Net will be richer for it -- and so will you.

1 7 WHEN THINGS GO WRONG

* Your computer connects with a public-access site and get gibberish on your screen

If you are using parameters of 8-1-N, try 7-1-e (or vice-versa) If that doesn't work, try another modem speed

* You have your computer dial a public-access site, but nothing happens

Check the phone number you typed in If correct, turn on your modem's speaker (on Hayes-compatible modems, you can usually do this by typing ATM1 in your communications software's "terminal mode") If the phone just rings and rings, the public-access site could be down for maintenance or due to a crash or some other problem. If you get a "connect" message, but nothing else, try hitting enter or escape a couple of times.

* You try to log in, but after you type your password, nothing happens, or you get a "timed out" message followed by a disconnect

Re-dial the number and try it again.

* Always remember, if you have a problem that just doesn't go away, ask! Ask your system administrator, ask a friend, but ask. Somebody will know what to do

1 8 FYI

The Net grows so fast that even the best guide to its resources would be somewhat outdated the day it was printed. At the end of each chapter, however, you'll find FYI pointers to places on the Net where you can go for more information or to keep updated on new resources and services

Peter Kaminski maintains a list of systems that provide public access to Internet services. It's availble on the network itself, which obviously does you little good if you currently have no access, but which can prove invaluable should you move or want to find a new system. Look for his "PDIAL" file in the alt.bbs.lists or news.answers newsgroups in Usenet (for information on accessing Usenet, see Chapter 3)

Steven Levy's book, "Hackers: Heroes of the Computer Revolution," (Anchor Press/Doubleday, 1984). describes the early culture and ethos that ultimately resulted in the Internet and Usenet.

John Quarterman's "The Matrix: Computer Networks and Conferencing Systems Worldwide" (Digital Press, 1990) is an exhaustive look at computer networks and how they connect with each other.

You'll find numerous documents about the Internet, its history and its resources in the pub/Net_info directory on the Electronic Frontier Foundation's FTP server (see chapter 7 to decipher this)

Chapter 3 USENET I

3.1 THE GLOBAL WATERING HOLE

Imagine a conversation carried out over a period of hours and days, as if people were leaving messages and responses on a bulletin board. Or imagine the electronic equivalent of a radio talk show where everybody can put their two cents in and no one is ever on hold

Unlike e-mail, which is usually "one-to-one," Usenet is "many-to-many " Usenet is the international meeting place, where people gather to meet their friends, discuss the day's events, keep up with computer trends or talk about whatever's on their mind Jumping into a Usenet discussion can be a liberating experience Nobody knows what you look or sound like, how old you are, what your background is. You're judged solely on your words, your ability to make a point

To many people, Usenet IS the Net. In fact, it is often confused with Internet But it is a totally separate system All Internet sites CAN carry Usenet, but so do many non-Internet sites, from sophisticated Unix machines to old XT clones and Apple IIs

Technically, Usenet messages are shipped around the world, from host system to host system, using one of several specific Net protocols Your host system stores all of its Usenet messages in one place, which everybody with an account on the system can access That way, no matter how many people actually read a given message, each host system has to store only one copy of it Many host systems "talk" with several others regularly in case one or another of their links goes down for some reason When two host systems connect, they basically compare notes on which Usenet messages they already have Any that one is missing the other then transmits, and vice-versa. Because they are computers, they don't mind running through thousands, even millions, of these comparisons every day

Yes, millions For Usenet is huge Every day, Usenet users pump upwards of 40 million characters a day into the system -- roughly the equivalent of volumes A-G of the Encyclopedia Britannica. Obviously, nobody could possibly keep up with this immense flow of messages Let's look at how to find conferences and discussions of interest to you

The basic building block of Usenet is the newsgroup, which is a collection of messages with a related theme (on other networks, these would be called conferences, forums, bboards or special-interest groups). There are now more than 5,000 of these newsgroups, in several diferent languages, covering everything from art to zoology, from science fiction to South Africa

Some public-access systems, typically the ones that work through menus, try to make it easier by dividing Usenet into several broad categories Choose one of those and you're given a list of newsgroups in that category Then select the newsgroup you're interested in and start reading.

Other systems let you compile your own "reading list" so that you only see messages in conferences you want In both cases, conferences are arranged in a particular hierarchy devised in the early 1980s Newsgroup names start with one of a series of broad topic names For example, newsgroups beginning with "comp." are about particular computer-related topics These broad topics are followed by a series of more focused topics (so that "comp unix" groups are limited to discussion about Unix) The main hierarchies are:

bionet	Research biology
bit listserv	Conferences originating as Bitnet mailing lists
biz	Business
comp	Computers and related subjects
misc	Discussions that don't fit anywhere else
news	News about Usenet itself
rec	Hobbies, games and recreation
sci	Science other than research biology
soc	"Social" groups, often ethnically related
talk	Politics and related topics
alt	Controversial or unusual topics, not carried by all sites

In addition, many host systems carry newsgroups for a particular city, state or region For example, ne housing is a newsgroup where New Englanders look for apartments A growing number also carry K12 newsgroups, which are aimed at elementary and secondary teachers and students And a number of sites carry clari newsgroups, which is actually a commercial service consisting of wire-service stories and a unique online computer news service (more on this in chapter 10)

3 2 NAVIGATING USENET WITH nn

How do you dive right in? As mentioned, on some systems, it's all done through menus -- you just keep choosing from a list of choices until you get to the newsgroup you want and then hit the "read" command On Unix systems, however, you will have to use a "newsreader" program Two of the more common ones are known as rn (for "read news") and nn (for "no news" -- because it's supposed to be simpler to use).

For beginners, nn may be the better choice because it works with menus -- you get a list of articles in a given newsgroup and then you choose which ones you want to see To try it out, connect to your host system and, at the command line, type

```
nn news announce newusers
```

and hit enter After a few seconds, you should see something like this

```
Newsgroup: news announce newusers              Articles  22 of 22/1 NEW

a Gene Spafford  776  Answers to Frequently Asked Questions
b Gene Spafford  362  A Primer on How to Work With the Usenet Community
c Gene Spafford  387  Emily Postnews Answers Your Questions on Netiquette
d Gene Spafford  101  Hints on writing style for Usenet
e Gene Spafford   74  Introduction to news announce
f Gene Spafford  367  USENET Software  History and Sources
g Gene Spafford  353  What is Usenet?
h taylor         241  A Guide to Social Newsgroups and Mailing Lists
i Gene Spafford  585  Alternative Newsgroup Hierarchies, Part I
j Gene Spafford  455  >Alternative Newsgroup Hierarchies, Part II
k David C Lawrenc 151  How to Create a New Newsgroup
l Gene Spafford  106  How to Get Information about Networks
m Gene Spafford  888  List of Active Newsgroups
n Gene Spafford  504  List of Moderators
o Gene Spafford 1051  Publicly Accessible Mailing Lists, Part I
p Gene Spafford 1123  Publicly Accessible Mailing Lists, Part II
q Gene Spafford 1193  >Publicly Accessible Mailing Lists, Part III
r Jonathan Kamens 644  How to become a USENET site
s Jonathan Kamen 1344  List of Periodic Informational Postings, Part I

-- 15 52 -- SELECT -- help ? -----Top 85%-----
Explanatory postings for new users  (Moderated)
```

Obviously, this is a good newsgroup to begin your exploration of Usenet! Here's what all this means The first letter on each line is the letter you type to read that particular "article" (it makes sense that a "newsgroup" would have "articles"). Next comes the name of the person who wrote that article, followed by its length, in lines, and what the article is about At the bottom, you see the local time at your access site, what you're doing right now (i.e , SELECTing articles), which key to hit for some help (the ? key) and how many of the articles in the newsgroup you can see on this screen The "(moderated)" means the newsgroup has a "moderator" who is the only one who can directly post messages to it. This is generally limited to groups such as this, which contain articles of basic information, or for digests, which are basically online magazines (more on them in a bit)

Say you're particularly interested in what "Emily Postnews" has to say about proper etiquette on Usenet. Hit your c key (lower case!), and the line will light up If you want to read something else, hit the key that corresponds to it And if you want to see what's on the next page of articles, hit return or your space bar.

But you're impatient to get going, and you want to read that article now. The command for that in nn is a capital Z Hit it and you'll see something like this

```
Gene Spafford: Emily Postnews Answers Your Questions on NetiquetteSep 92 04:17
Original-author: brad@looking on ca (Brad Templeton)
Archive-name emily-postnews/part1
Last-change 30 Nov 91 by brad@looking on.ca (Brad Templeton)


**NOTE this is intended to be satirical. If you do not recognize
 it as such, consult a doctor or professional comedian The
 recommendations in this article should recognized for what
 they are -- admonitions about what NOT to do.


              "Dear Emily Postnews"

     Emily Postnews, foremost authority on proper net behaviour,
     gives her advice on how to act on the net

==============================================================================
=======

Dear Miss Postnews How long should my signature be? -- verbose@noisy

A Dear Verbose Please try and make your signature as long as you
-- 09 57 -- announce newusers-- LAST --help ?--Top 4%--
```

The first few lines are the message's header, similar to the header you get in e-mail messages Then comes the beginning of the message The last line tells you the time again, the newsgroup name (or part of it, anyway), the position in your message stack that this message occupies, how to get help, and how much of the message is on screen If you want to keep reading this message, just hit your space bar (not your enter key!) for the next screen and so on until done. When done, you'll be returned to the newsgroup menu For now hit Q (upper case this time), which quits you out of nn and returns you to your host system's command line.

To get a look at another interesting newsgroup, type

```
nn comp risks
```

and hit enter This newsgroup is another moderated group, this time a digest of all the funny and frightening ways computers and the people who run and use them can go wrong Again, you read articles by selecting their letters. If you're in the middle of an article and decide you want to go onto the next one, hit your n key

Now it's time to look for some newsgroups that might be of particular interest to you Unix host systems that have nn use a program called nngrep (ever get the feeling Unix was not entirely written in English?) that lets you scan newsgroups Exit nn and at your host system's command line, type

```
nngrep word
```

where word is the subject you're interested in. If you use a Macintosh computer, you might try

```
nngrep mac
```

You'll get something that looks like this

```
alt music.machines of loving grace
alt religion.emacs
comp binaries mac
comp emacs
comp lang.forth mac
comp os mach
comp.sources mac
comp sys mac announce
comp sys mac.apps
comp sys mac comm
comp sys mac.databases
comp sys.mac digest
comp sys mac games
comp sys mac hardware
comp.sys mac hypercard
comp sys mac.misc
comp sys mac programmer
```

```
comp.sys.mac.system
comp sys.mac.wanted
gnu emacs announce
gnu emacs bug
gnu.emacs gnews
gnu emacs gnus
gnu emacs help
gnu emacs.lisp manual
gnu emacs.sources
gnu emacs.vm bug
gnu emacs.vm.info
gnu.emacs vms
```

Note that some of these obviously have something to do with Macintoshes while some obviously do not, nngrep is not a perfect system. If you want to get a list of ALL the newsgroups available on your host system, type

```
nngrep -a |more
```

or

```
nngrep -a |pg
```

and hit enter (which one to use depends on the Unix used on your host system, if one doesn't do anything, try the other) You don't absolutely need the |more or |pg, but if you don't include it, the list will keep scrolling, rather than pausing every 24 lines If you are in nn, hitting a capital Y will bring up a similar list.

Typing "nn newsgroup" for every newsgroup can get awfully tiring after awhile When you use nn, your host system looks in a file called newsrc This is basically a list of every newsgroup on the host system along with notations on which groups and articles you have read (all maintained by the computer). You can also use this file to create a "reading list" that brings up each newsgroup to which you want to "subscribe " To try it out, type

```
nn
```

without any newsgroup name, and hit enter

Unfortunately, you will start out with a newsrc file that has you "subscribed" to every single newsgroup on your host system! To delete a newsgroup from your reading list, type a capital U while its menu is on the screen The computer will ask you if you're sure you want to "unsubscribe " If you then hit a Y, you'll be unsubscribed and put in the next group

With many host systems carrying thousands of newsgroups, this will take you forever.

Fortunately, there are a couple of easier ways to do this Both involve calling up your newsrc file in a word or text processor. In a newsrc file, each newsgroup takes up one line, consisting of the group's name, an exclamation point or a colon and a range of numbers. Newsgroups with a colon are ones to which you are subscribed; those followed by an exclamation point are "un-subscribed " To start with a clean slate, then, you have to change all those colons to exclamation points.

If you know how to use emacs or vi, call up the newsrc file (you might want to make a copy of newsrc first, just in case), and use the search-and-replace function to make the change

If you're not comfortable with these text processor, you can download the .newsrc file, make the changes on your own computer and then upload the revised file. Before you download the file, however, you should do a couple of things One is to type

```
cp  newsrc temprc
```

and hit enter. You will actually download this temprc file (note the name does not start with a period -- some computers, such as those using MS-DOS, do not allow file names starting with periods). After you download the file, open it in your favorite word processor and use its search-and-replace function to change the exclamation points to colons. Be careful not to change anything else! Save the document in ASCII or text format Dial back into your host system At the command line, type

```
cp temprc temprc1
```

and hit enter. This new file will serve as your backup newsrc file just in case something goes wrong Upload the temprc file from your computer This will overwrite the Unix system's old temprc file Now type

```
cp temprc  newsrc
```

and hit enter You now have a clean slate to start creating a reading list

3.3 nn COMMANDS

To mark a specific article for reading, type the letter next to it (in lower case) To mark a specific article and all of its responses, type the letter and an asterisk, for example:

a*

To un-select an article, type the letter next to it (again, in lower case)

C	Cancels an article (around the world) that you wrote Every article posted on Usenet has a unique ID number Hitting a capital C sends out a new message that tells host systems that receive it to find earlier message and delete it.
F	To post a public response, or follow-up If selected while still on a newsgroup "page", asks you which article to follow up If selected while in a specific article, will follow up that article In either case, you'll be asked if you want to include the original article in yours Caution puts you in whatever text editor is your default
N	Goes to the next subscribed newsgroup with unread articles
P	Goes to the previous subscribed newsgroup with unread articles
G news group	Goes to a specific newsgroup Can be used to subscribe to new newsgroups Hitting G brings up a sub-menu u Goes to the group and shows only un-read articles a Goes to the group and shows all articles, even ones you've already read s Will show you only articles with a specific subject n Will show you only articles from a specific person
M	Mails a copy of the current article to somebody You'll be asked for the recipient's e-mail address and whether you want to add any comments to the article before sending it off As with F, puts you in the default editor

post	Post an article. You'll be asked for the name of the group.
Q	Quit, or exit, nn.
U	Un-subscribe from the current newsgroup
R	Responds to an article via e-mail
space	Hitting the space bar brings up the next page of articles
X	If you have selected articles, this will show them to you and then take you to the next subscribed newsgroup with unread articles If you don't have any selected articles, it marks all articles as read and takes you to the next unread subscribed newsgroup
=word	Finds and marks all articles in the newsgroup with a specific word in the "subject." line, for example =modem
Z	Shows you selected articles immediately and then returns you to the current newsgroup
?	Brings up a help screen
<	Goes to the previous page in the newsgroup.
>	Goes to the next page in the newsgroup
$	Goes to the last page in an article
^	Goes to the first page in an article

3 4 USING rn

Some folks prefer this older newsreader
If you type

```
rn news announce newusers
```

at your host system's command line, you'll see something like this.

```
******** 21 unread articles in news.announce.newusers--read now? [ynq]
```

If you hit your Y key, the first article will appear on your screen. If you want to see what articles are available first, though, hit your computer's = key and you'll get something like this:

```
152 Introduction to news.announce
153 A Primer on How to Work With the Usenet Community
154 What is Usenet?
155 Answers to Frequently Asked Questions
156 Hints on writing style for Usenet
158 Alternative Newsgroup Hierarchies, Part I
159 Alternative Newsgroup Hierarchies, Part II
160 Emily Postnews Answers Your Questions on Netiquette
161 USENET Software: History and Sources
162 A Guide to Social Newsgroups and Mailing Lists
163 How to Get Information about Networks
164 How to Create a New Newsgroup
169 List of Active Newsgroups
170 List of Moderators
171 Publicly Accessible Mailing Lists, Part I
172 Publicly Accessible Mailing Lists, Part II
173 Publicly Accessible Mailing Lists, Part III
174 How to become a USENET site
175 List of Periodic Informational Postings, Part I
176 List of Periodic Informational Postings, Part II
177 List of Periodic Informational Postings, Part III
End of article 158 (of 178)--what next? [npq]
```

Notice how the messages are in numerical order this time, and don't tell you who sent them. Article 154 looks interesting. To read it, type in 154 and hit enter. You'll see something like this:

```
Article 154 (20 more) in news.announce.newusers (moderated):
From: spaf@cs.purdue.EDU (Gene Spafford)
Newsgroups: news.announce.newusers,news.admin,news.answers
Subject: What is Usenet?
Date: 20 Sep 92 04:17:26 GMT
Followup-To: news.newusers.questions
Organization: Dept. of Computer Sciences, Purdue Univ.
Lines: 353
Supersedes: <spaf-whatis_715578719@cs.purdue.edu>

Archive-name: what-is-usenet/part1
```

```
Original from  chip@tct.com (Chip Salzenberg)
Last-change: 19 July 1992 by spaf@cs.purdue.edu (Gene Spafford)


The first thing to understand about Usenet is that it is widely
misunderstood  Every day on Usenet, the "blind men and the elephant"
phenomenon is evident, in spades  In my opinion, more flame wars
arise because of a lack of understanding of the nature of Usenet than
from any other source. And consider that such flame wars arise, of
necessity, among people who are on Usenet  Imagine, then, how poorly
understood Usenet must be by those outside!

--MORE--(7%)
```

This time, the header looks much more like the gobbledygook you get in e-mail messages To keep reading, hit your space bar If you hit your n key (lower case), you'll go to the next message in the numerical order

To escape rn, just keep hitting your q key (in lower case), until you get back to the command line Now let's set up your reading list Because rn uses the same newsrc file as nn, you can use one of the search-and-replace methods described above Or you can do this Type

```
rn
```

and hit enter When the first newsgroup comes up on your screen, hit your u key (in lower case) Hit it again, and again, and again Or just keep it pressed down (if your computer starts beeping, let up for a couple of seconds) Eventually, you'll be told you're at the end of the newsgroups, and asked what you want to do next

Here's where you begin entering newsgroups Type

```
g newsgroup
```

(for example, g comp sys mac announce) and hit enter You'll be asked if you want to "subscribe " Hit your y key Then type

```
g next newsgroup
```

(for example, g comp announce newusers) and hit enter. Repeat until done This process will also set up your reading list for nn, if you prefer that newsreader But how do you know which newsgroups to subscribe? Typing a lowercase l and then hitting enter will show you a list of all available newsgroups Again, since there could be more than 2,000 newsgroups on your system, this might not be something you want to do. Fortunately, you can search for groups with particular words in their names, using the l command. Typing

```
l mac
```

followed by enter, will bring up a list of newsgroups with those letters in them (and as in nn, you will also see groups dealing with emacs and the like, in addition to groups related to Macintosh computers)

Because of the vast amount of messages transmitted over Usenet, most systems carry messages for only a few days or weeks. So if there's a message you want to keep, you should either turn on your computer's screen capture or save it to a file which you can later download) To save a message as a file in rn, type

```
s filename
```

where filename is what you want to call the file. Hit enter. You'll be asked if you want to save it in "mailbox format." In most cases, you can answer with an n (which will strip off the header) The message will now be saved to a file in your News directory (which you can access by typing cd News and then hitting enter)

Also, some newsgroups fill up particularly quickly -- go away for a couple of days and you'll come back to find hundreds of articles! One way to deal with that is to mark them as "read" so that they no longer appear on your screen In nn, hit a capital J, in rn, a small c

3.5 rn COMMANDS

Different commands are available to you in rn depending on whether you are already in a newsgroup or reading a specific article At any point, typing a lowercase h will bring up a list of available commands and some terse instructions for using them Here are some of them

After you've just called up rn, or within a newsgroup:

c Marks every article in a newsgroup as read (or "caught up") so that you don't have to see them again The system will ask you if you are sure Can be done either when asked if you want to read a particular newsgroup or once in the newsgroup.

g Goes to a newsgroup, in this form

```
g news group
```

Use this both for going to groups to which you're already subscribed and subscribing to new groups

h	Provides a list of available commands with terse instructions
l	Gives a list of all available newsgroups
p	Goes to the first previous subscribed newsgroup with un-read articles
q	Quits, or exits, rn if you have not yet gone into a newsgroup If you are in a newsgroup, it quits that one and brings you to the next subscribed newsgroup

Only within a newsgroup

=	Gives a list of all available articles in the newsgroup
m	Marks a specific article or series of articles as "un-read" again so that you can come back to them later. Typing 1700m and hitting enter would mark just that article as un-read Typing 1700-1800m and hitting enter would mark all of those articles as un-read
space	Brings up the next page of article listings If already on the last page, displays the first article in the newsgroup
u	Un-subscribe from the newsgroup
/text/	Searches through the newsgroup for articles with a specific word or phrase in the "subject " line, from the current article to the end of the newsgroup For example, /EFF/

would bring you to the first article with "EFF" in the "subject " line

?text?	The same as /text/ except it searches in reverse order from the current article

Only within a specific article.

e	Some newsgroups consist of articles that are binary files, typically programs or graphics images. Hitting e will convert the ASCII characters within such an article into a file you can then download and use or view (assuming you have the proper computer and software). Many times, such files will be split into several articles, just keep calling up the articles and hitting e until done You'll find the resulting file in your News subdirectory.
C	If you post an article and then decide it was a mistake, call it up on your host system and hit this. The message will soon begin disappearing on systems around the world.
F	Post a public response in the newsgroup to the current article Includes a copy of her posting, which you can then edit down using your host system's text editor
f	The same as above except it does not include a copy of the original message in yours
m	Marks the current article as "un-read" so that you can come back to it later You do not have to type the article number.
Control-N	Brings up the first response to the article. If there is no follow-up article, this returns you to the first unread article in the newsgroup)
Control-P	Goes to the message to which the current article is a reply.
n	Goes to the next unread article in the newsgroup
N	Takes you to the next article in the newsgroup even if you've already read it
q	Quits, or exits, the current article Leaves you in the current newsgroup

R	Reply, via e-mail only, to the author of the current article Includes a copy of his message in yours.
r	The same as above, except it does not include a copy of his article.
s file	Copies the current article to a file in your News directory, where "file" is the name of the file you want to save it to You'll be asked if you want to use "mailbox" format when saving If you answer by hitting your N key, most of the header will not be saved
s|mail user	Mails a copy of the article to somebody. For "user" substitute an e-mail address. Does not let you add comments to the message first, however
space	Hitting the space bar shows the next page of the article, or, if at the end, goes to the next un-read article.

3 6 ESSENTIAL NEWSGROUPS

With so much to choose from, everybody will likely have their own unique Usenet reading list. But there are a few newsgroups that are particularly of interest to newcomers Among them

news announce newusers	This group consists of a series of articles that explain various facets of Usenet.
news newusers questions	This is where you can ask questions (we'll see how in a bit) about how Usenet works
news announce newsgroups	Look here for information about new or proposed newsgroups
news answers	Contains lists of "Frequently Asked Questions" (FAQs) and their answers from many different newsgroups Learn how to fight jet lag in the FAQ from rec travel air; look up answers to common questions about Microsoft Windows in

	an FAQ from comp.os ms-windows, etc.
alt internet.services	Looking for something in particular on the Internet? Ask here.
alt.infosystems announce	People adding new information services to the Internet will post details here.

3 7 SPEAKING UP

"Threads" are an integral part of Usenet When somebody posts a message, often somebody else will respond. Soon, a thread of conversation begins Following these threads is relatively easy In nn, related messages are grouped together In rn, when you're done with a message, you can hit control-N to read the next related message, or followup As you explore Usenet, it's probably a good idea to read discussions for awhile before you jump in This way, you can get a feel for the particular newsgroup -- each has its own rhythms

Eventually, though, you'll want to speak up There are two main ways to do this You join an existing conversation, or you can start a whole new thread

If you want to join a discussion, you have to decide if you want to include portions of the message you are responding to in your message The reason to do this is so people can see what you're responding to, just in case the original message has disappeared from their system (remember that most Usenet messages have a short life span on the average host system) or they can't find it

If you're using a Unix host system, joining an existing conversation is similar in both nn and rn hit your F key when done with a given article in the thread In rn, type a small f if you don't want to include portions of the message you're responding to, an uppercase F if you do In nn, type a capital F You'll then be asked if you want to include portions of the original message

And here's where you hit another Unix wall When you hit your F key, your host system calls up its basic Unix text editor If you're lucky, that'll be pico, a very easy system More likely, however, you'll get dumped into emacs (or possibly vi), which you've already met in the chapter on e-mail.

The single most important emacs command is

```
control-x control-c
```

This means, depress your control key and hit x. Then depress the control key and hit c Memorize this In fact, it's so important, it bears repeating

control-x control-c

These keystrokes are how you get out of emacs If they work well, you'll be asked if you want to send, edit, abort or list the message you were working on If they don't work well (say you accidentally hit some other weird key combination that means something special to emacs) and nothing seems to happen, or you just get more weird-looking emacs prompts on the bottom of your screen, try hitting control-g This should stop whatever emacs was trying to do (you should see the word "quit" on the bottom of your screen), after which you can hit control-x control-c. But if this still doesn't work, remember that you can always disconnect and dial back in!

If you have told your newsreader you do want to include portions of the original message in yours, it will automatically put the entire thing at the top of your message Use the arrow keys to move down to the lines you want to delete and hit control-K, which will delete one line at a time.

You can then write your message Remember that you have to hit enter before your cursor gets to the end of the line, because emacs does not have word wrapping.

When done, hit control-X control-C You'll be asked the question about sending, editing, aborting, etc Choose one. If you hit Y, your host system will start the process to sending your message across the Net.

The nn and rn programs work differently when it comes to posting entirely new messages In nn, type

post

and hit enter in any newsgroup You'll be asked which newsgroup to post a message to Type in its name and hit enter Then you'll be asked for "keywords." These are words you'd use to attract somebody scanning a newsgroup Say you're selling your car You might type the type of car here Next comes a "summary" line, which is somewhat similar Finally, you'll be asked for the message's "distribution " This is where you put how widely you want your message disseminated. Think about this one for a second. If you are selling your car, it makes little sense to send a message about it all over the world. But if you want to talk about the environment, it might make a lot of sense Each host system has its own set of distribution classifications, but there's generally a local one (just for users of that system), one for the city, state or region it's in, another for the country (for example, usa), one for the continent (for Americans and Canadians, na) and finally, one for the entire world (usually: world).

Which one to use? Generally, a couple of seconds' thought will help you decide If you're selling your car, use your city or regional distribution -- people in Australia won't much care and may even get annoyed. If you want to discuss presidential politics, using a USA distribution makes more sense. If you want to talk about events in the Middle East, sending your message to the entire world is perfectly acceptable

Then you can type your message. If you've composed your message offline (generally a good idea if you and emacs don't get along), you can upload it now. You may see a lot of weird looking characters as it uploads into emacs, but those will disappear when you hit control-X and then control-C. Alternately, "save" the message (for example, by hitting m in rn), log out, compose your message offline, log back on and upload your message into a file on your host system Then call up Usenet, find the article you "saved " Start a reply, and you'll be asked if you want to include a prepared message Type in the name of the file you just created and hit enter

In rn, you have to wait until you get to the end of a newsgroup to hit F, which will bring up a message-composing system. Alternately, at your host system's command line, you can type

```
Pnews
```

and hit enter You'll be prompted somewhat similarly to the nn system, except that you'll be given a list of possible distributions If you chose "world," you'll get this message:

```
This program posts news to thousands of machines throughout the entire
civilized world  Your message will cost the net hundreds if not thousands of
dollars to send everywhere  Please be sure you know what you are doing

Are you absolutely sure that you want to do this? [ny]
```

Don't worry -- your message won't really cost the Net untold amounts, although, again, it's a good idea to think for a second whether your message really should go everywhere

If you want to respond to a given post through e-mail, instead of publicly, hit R in nn or r or R in rn. In rn, as with follow-up articles, the upper-case key includes the original message in yours.

Most newsgroups are unmoderated, which means that every message you post will eventually wind up on every host system within the geographic region you specified that carries that newsgroup.

Some newsgroups, however, are moderated, as you saw earlier with comp risks. In these groups, messages are shipped to a single location where a moderator, acting much like a magazine editor, decides what actually gets posted. In some cases, groups are moderated like scholarly journals In other cases, it's to try to cut down on the massive number of messages that might otherwise be posted

You'll notice that many articles in Usenet end with a fancy "signature" that often contains some witty saying, a clever drawing and, almost incidentally, the poster's name and e-mail address You too can have your own "signature" automatically appended to everything you post On your own computer, create a signature file. Try to keep it to four lines or less, lest you annoy others on the Net Then, while connected to your host system, type

```
cat> signature
```

and hit enter (note the period before the s) Upload your signature file into this using your communications software's ASCII upload protocol. When done, hit control-D, the Unix command for closing a file. Now, every time you post a message, this will be appended to it.

There are a few caveats to posting Usenet is no different from a Town Meeting or publication you're not supposed to break the law, whether that's posting copyrighted material or engaging in illegal activities It is also not a place to try to sell products (except in certain biz and for-sale newsgroups).

3 8 CROSS-POSTING

Sometimes, you'll have an issue you think should be discussed in more than one Usenet newsgroup Rather than posting individual messages in each group, you can post the same message in several groups at once, through a process known as cross-posting

Say you want to start a discussion about the political ramifications of importing rare tropical fish from Brazil. People who read rec aquaria might have something to say So might people who read alt politics animals and talk politics.misc.

Cross-posting is easy. It also should mean that people on other systems who subscribe to several newsgroups will see your message only once, rather than several times -- news-reading software can cancel out the other copies once a person has read the message. When you get ready to post a message (whether through Pnews for rn or the ·post command in nn), you'll be asked in which newsgroups. Type the names of the various groups, separated by a comma, but no space, for example:

rec.aquaria,alt.politics.animals,talk.politics.misc

and hit enter. After answering the other questions (geographic distribution, etc.), the message will be posted in the various groups (unless one of the groups is moderated, in which case the message goes to the moderator, who decides whether to make it public).

It's considered bad form to post to an excessive number of newsgroups, or inappropriate newsgroups. Probably, you don't really have to post something in 20 different places. And while you may think your particular political issue is vitally important to the fate of the world, chances are the readers of rec.arts.comics will not, or at least not important enough to impose on them. You'll get a lot of nasty e-mail messages demanding you restrict your messages to the "appropriate" newsgroups.

Chapter 4. USENET II

4.1 FLAME, BLATHER AND SPEW

Something about online communications seems to make some people particularly irritable. Perhaps it's the immediacy and semi-anonymity of it all. Whatever it is, there are whole classes of people you will soon think seem to exist to make you miserable.

Rather than pausing and reflecting on a message as one might do with a letter received on paper, it's just so easy to hit your R key and tell somebody you don't really know what you really think of them. Even otherwise calm people sometimes find themselves turning into raving lunatics. When this happens, flames erupt.

A flame is a particularly nasty, personal attack on somebody for something he or she has written. Periodically, an exchange of flames erupts into a flame war that begin to take up all the space in a given newsgroup (and sometimes several; flamers like cross-posting to let the world know how they feel). These can go on for weeks (sometimes they go on for years, in which case they become "holy wars," usually on such topics as the relative merits of Macintoshes and IBMs). Often, just when they're dying down, somebody new to the flame war reads all the messages, gets upset and issues an urgent plea that the flame war be taken to e-mail so everybody else can get back to whatever the newsgroup's business is. All this usually does, though, is start a brand new flame war, in which this poor person comes under attack for daring to question the First Amendment, prompting others to jump on the attackers for impugning this poor soul. You get the idea.

Every so often, a discussion gets so out of hand that somebody predicts that either the government will catch on and shut the whole thing down or somebody will sue to close down the network, or maybe even the wrath of God will smote everybody involved. This brings what has become an inevitable rejoinder from others who realize that the network is, in fact, a resilient creature that will not die easily: "Imminent death of Usenet predicted. Film at 11."

Flame wars can be tremendously fun to watch at first. They quickly grow boring, though. And wait until the first time you're attacked!

Flamers are not the only net characters to watch out for.

Spewers assume that whatever they are particularly concerned about either really is of universal interest or should be rammed down the throats of people who don't seem to care -- as frequently as possible. You can usually tell a spewer's work by the number of articles he posts in a day on the same subject and the number of newsgroups to which he then sends these articles -- both can reach well into double digits Often, these messages relate to various ethnic conflicts around the world. Frequently, there is no conceivable connection between the issue at hand and most of the newsgroups to which he posts No matter If you try to point this out in a response to one of these messages, you will be inundated with angry messages that either accuse you of being an insensitive racist/American/whatever or ignore your point entirely to bring up several hundred more lines of commentary on the perfidy of whoever it is the spewer thinks is out to destroy his people.

Closely related to these folks are the Holocaust revisionists, who periodically inundate certain groups (such as soc.history) with long rants about how the Holocaust never really happened. Some people attempt to refute these people with facts, but others realize this only encourages them.

Blatherers tend to be more benign. Their problem is that they just can't get to the point -- they can wring three or four screenfuls out of a thought that others might sum up in a sentence or two A related condition is excessive quoting. People afflicted with this will include an entire message in their reply rather than excising the portions not relevant to whatever point they're trying to make The worst quote a long message and then add a single line·

"I agree!"

or some such, often followed by a monster signature (see section 4.5)

There are a number of other Usenet denizens you'll soon come to recognize Among them

Net.weenies. These are the kind of people who enjoy Insulting others, the kind of people who post nasty messages in a sewing newsgroup just for the hell of it

Net geeks People to whom the Net is Life, who worry about what happens when they graduate and they lose their free, 24-hour access.

Net gods The old-timers, the true titans of the Net and the keepers of its collective history. They were around when the Net consisted of a couple of computers tied together with baling wire

Lurkers Actually, you can't tell these people are there, but they are They're the folks who read a newsgroup but never post or respond

Wizards People who know a particular Net-related topic inside and out Unix wizards can perform amazing tricks with that operating system, for example

Net saints Always willing to help a newcomer, eager to share their knowledge with those not born with an innate ability to navigate the Net, they are not as rare as you might think Post a question about something and you'll often be surprised how many responses you get.

The last group brings us back to the Net's oral tradition. With few written guides, people have traditionally learned their way around the Net by asking somebody, whether at the terminal next to them or on the Net itself. That tradition continues. if you have a question, ask.

Today, one of the places you can look for help is in the news.newusers.questions newsgroup, which, as its name suggests, is a place to learn more about Usenet. But be careful what you post. Some of the Usenet wizards there get cranky sometimes when they have to answer the same question over and over again Oh, they'll eventually answer your question, but not before they tell you should have asked your host system administrator first or looked at the postings in news announce newusers.

4 2 KILLFILES, THE CURE FOR WHAT AILS YOU

As you keep reading Usenet, you are going to run across things or people that really drive you nuts -- or that you just get tired of seeing.

Killfiles are just the thing for you. When you start your newsreader, it checks to see if you have any lists of words, phrases or names you don't want to see If you do, then it blanks out any messages containing those words.

Such as cascades

As you saw earlier, when you post a reply to a message and include parts of that message, the original lines show up with a > in front of them. Well, what if you reply to a reply? Then you get a >> in front of the line. And if you reply to that reply? You get >>>. Keep this up, and soon you get a triangle of >'s building up in your message.

There are people who like building up these triangles, or cascades. They'll "respond" to your message by deleting everything you've said, leaving only the "In message 123435, you said:" part and the last line of your message, to which they add a nonsensical retort On and on they go until the triangle has reached the right end of the page. Then they try to expand the triangle by deleting one > with each new line. Whoever gets to finish this mega-triangle wins.

There is even a newsgroup just for such folks: alt cascade. Unfortunately, cascaders would generally rather cascade in other newsgroups. Because it takes a lot of messages to build up a completed cascade, the targeted newsgroup soon fills up with these messages Of course, if you complain, you'll be bombarded with messages about the First Amendment and artistic expression -- or worse, with another cascade. The only thing you can do is ignore them, by setting up a killfile

There are also certain newsgroups where killfiles will come in handy because of the way the newsgroups are organized. For example, readers of rec.arts.tv.soaps always use an acronym in their subject line for the show they're writing about (AMC, for example, for "All My Children"). This way, people who only want to read about "One Life to Live" can blank out all the messages about "The Young and the Restless" and all the others (to keep people from accidentally screening out messages that might contain the letters "gh" in them, "General Hospital" viewers always use "gh:" in their subject lines).

Both nn and rn let you create killfiles, but in different ways.

To create a killfile in nn, go into the newsgroup with the offending messages and type a capital K. You'll see this at the bottom of your screen.

```
AUTO (k)ill or (s)elect (CR => Kill subject 30 days)
```

If you hit return, nn will ask you which article's subject you're tired of Choose one and the article and any follow-ups will disappear, and you won't see them again for 30 days

If you type a lower-case k instead, you'll get this:

```
AUTO KILL on (s)ubject or (n)ame  (s)
```

If you hit your S key or just enter, you'll see this:

```
KILL Subject. (=/)
```

Type in the name of the offending word or phrase and hit enter You'll then be prompted:

```
KILL in (g)roup 'eff test' or in (a)ll groups  (g)
```

except that the name of the group you see will be the one you're actually in at the moment Because cascaders and other annoying people often cross-post their messages to a wide range of newsgroups, you might consider hitting a instead of g Next comes

```
Lifetime of entry in days (p)ermanent  (30)
```

The P key will screen out the offending articles forever, while hitting enter will do it for 30 days. You can also type in a number of days for the blocking.

Creating killfiles in rn works differently -- its default killfile generator only works for messages in specific groups, rather than globally for your entire newsgroup list To create a global killfile, you'll have to write one yourself

To create a killfile in rn, go into the newsgroup where the offending messages are and type in its number so you get it on your screen Type a capital K From now on, any message with that subject line will disappear before you read the group. You should probably choose a reply, rather than the original message, so that you will get all of the followups (the original message won't have a "Re: " in its subject line). The next time you call up that newsgroup, rn will tell you it's killing messages. When it's done, hit the space bar to go back into reading mode.

To create a "global" kill file that will automatically wipe out articles in all groups you read, start rn and type control-K. This will start your whatever text editor you have as your default on your host system and create a file (called KILL, in your News subdirectory)

On the first line, you'll type in the word, phrase or name you don't want to see, followed by commands that tell rn whether to search an entire message for the word or name and then what to do when it finds it

Each line must be in this form

```
/pattern/modifier:j
```

"Pattern" is the word or phrase you want rn to look for. It's case-insensitive: both "test" and "Test" will be knocked out The modifier tells rn whether to limit its search to message headers (which can be useful when the object is to never see messages from a particular person):

- a. Looks through an entire message
- h Looks just at the header

You can leave out the modifier command, in which case rn will look only at the subject line of messages. The "j" at the end tells rn to screen out all articles with the offending word.

So if you never want to see the word "foo" in any header, ever again, type this.

```
/foo/h:j
```

This is particularly useful for getting rid of articles from people who post in more than one newsgroup, such as cascaders, since an article's newsgroup name is always in the header.

If you just want to block messages with a subject line about cascades, you could try:

```
/foo/:j
```

To kill anything that is a followup to any article, use this pattern:

```
/Subject  *Re./:j
```

When done writing lines for each phrase to screen, exit the text editor as you normally would, and you'll be put back in rn.

One word of caution· go easy on the global killfile. An extensive global killfile, or one that makes frequent use of the a· modifier can dramatically slow down rn, since the system will now have to look at every single word in every single message in all the newsgroups you want to read.

If there's a particular person whose posts you never want to see again, first find his or her address (which will be in the "from." line of his postings) and then write a line in your killfile like this.

```
/From. *name@address\.all/h·j
```

4 3 SOME USENET HINTS

Case counts in Unix -- most of the time. Many Unix commands, including many of those used for reading Usenet articles, are case sensitive. Hit a d when you meant a D and either nothing will happen, or something completely different from what you expected will happen So watch that case!

In nn, you can get help most of the time by typing a question mark (the exception is when you are writing your own message, because then you are inside the text-processing program) In rn, type a lower-case h at any prompt to get some online help.

When you're searching for a particular newsgroup, whether through the l command in rn or with nngrep for nn, you sometimes may have to try several keywords For example, there is a newsgroup dedicated to the Grateful Dead, but you'd never find it if you tried, say, l grateful dead, because the name is rec music gdead In general, try the smallest possible part of the word or discussion you're looking for, for example, use "trek" to find newsgroups about "Star Trek " If one word doesn't produce anything, try another.

Like the rest of the world, Usenet has its share of urban legends and questionable activities. There are three in particular that plague the network. Spend more than, oh, 15 minutes within Usenet and you're sure to run into the Brain Tumor Boy, the plot by the evil FCC to tax your modem and Dave Rhode's miracle cure for poverty. For the record, here's the story on all of them.

There once was a seven-year-old boy in England named Craig Shergold who was diagnosed with a seemingly incurable brain tumor. As he lay dying, he wished only to have friends send him postcards The local newspapers got a hold of the tear-jerking story Soon, the boy's wish had changed he now wanted to get into the Guinness Book of World Records for the largest postcard collection Word spread around the world People by the millions sent him postcards.

Miraculously, the boy lived An American billionaire even flew him to the U.S. for surgery to remove what remained of the tumor And his wish succeeded beyond his wildest dreams -- he made the Guinness Book of World Records

But with Craig now well into his teens, his dream has turned into a nightmare for the post office in the small town outside London where he lives. Like Craig himself, his request for cards just refuses to die, inundating the post office with millions of cards every year. Just when it seems like the flow is slowing, along comes somebody else who starts up a whole new slew of requests for people to send Craig post cards (or greeting cards or business cards -- Craig letters have truly taken on a life of their own and begun to mutate). Even Dear Abby has been powerless to make it stop!

What does any of this have to do with the Net? The Craig letter seems to pop up on Usenet as often as it does on cork boards at major corporations No matter how many times somebody like Gene Spafford posts periodic messages to ignore them or spend your money on something more sensible (a donation to the local Red Cross, say), somebody manages to post a letter asking readers to send cards to poor little Craig.

Don't send any cards to the Federal Communications Commission, either

In 1987, the FCC considered removing a tax break it had granted CompuServe and other large commercial computer networks for use of the national phone system. The FCC quickly reconsidered after alarmed users of bulletin-board systems bombarded it with complaints about this "modem tax."

Now, every couple of months, somebody posts an "urgent" message warning Net users that the FCC is about to impose a modem tax. This is

NOT true. The way you can tell if you're dealing with the hoax story is simple· it ALWAYS mentions an incident in which a talk-show host on KGO radio in San Francisco becomes outraged on the air when he reads a story about the tax in the New York Times.

Another way to tell it's not true is that it never mentions a specific FCC docket number or closing date for comments.

Save that letter to your congressman for something else

Sooner or later, you're going to run into a message titled "Make Money Fast " It's your basic chain letter. The Usenet version is always about some guy named Dave Rhodes who was on the verge of death, or something, when he discovered a perfectly legal way to make tons of money -- by posting a chain letter on computer systems around the world Yeah, right

4.5 BIG SIG

There are sigs and there are .sigs Many people put only bare-bones information in their sig files -- their names and e-mail addresses, perhaps their phone numbers Others add a quotation they think is funny or profound and a disclaimer that their views are not those of their employer Still others add some ASCII-art graphics. And then there are those who go totally berserk, posting huge creations with multiple quotes, hideous ASCII "barfics" and more e-mail addresses than anybody could humanly need College freshmen unleashed on the Net seem to excel at these You can see the best of the worst in the alt fan warlord newsgroup, which exists solely to critique sigs that go too far, such as

```
------------------------------------------------------------------------------
|#############################################################################|
|#|                                     |#|
|#|  *****  *   *  *****   *  *  *****  *****  *****         |#|
|#|    *   *   * *      ** ** *    *    *  *        |#|
|#|    *   ****** ***    * * * ***   *  **  *****  *****      |#|
|#|    *   *   * *      *  * *    *  *  *  *        |#|
|#|    *   *   *  *****   *  *  *****  *****  *  *          |#|
|#|                                     |#|
|#|  ****  *****  *****       *****  *****  *****   *****  *****  |#|
|#|  *  **   *   *         *     *   *     *    *  *  |#|
|#|  ****    *   *  **      *****   *   *  **   *    *  *  |#|
|#|  *  **   *   *   *    **    *   *   *   *   *    *  *  |#|
|#|  ****  *****  *****    **  *****  *****  *****   *****  *****  |#|
|#|                                     |#|
|#|       T-H-E  M-E-G-A  B-I-G  S-I-G  C-O-M-P-A-N-Y          |#|
|#|               ~---------------------------~          |#|
|#| "Annoying people with huge net.signatures for over 20 years.. "  |#|
|#|                                    |#|
|#|------------------------------------------------------------|#|
|#| "The difference between a net idiot and a bucket of shit is that at |#|
|#| least a bucket can be emptied  Let me further illustrate my point |#|
|#| by comparing these charts here  (pulls out charts)  Here we have a |#|
|#| user who not only flames people who don't agree with his narrow-  |#|
|#| minded drivel, but he has this huge signature that takes up many  |#|
|#| pages with useless quotes  This also makes reading his frequented |#|
|#| newsgroups a torture akin to having at 300 baud modem on a VAX. I  |#|
|#| might also add that his contribution to society rivals only toxic  |#|
|#| dump sites "                                |#|
|#|               -- Robert A. Dumpstik, Jr            |#|
|#|                  President of The Mega Big Sig Company       |#|
|#|                  September 13th, 1990 at 4 15pm       |#|
|#|                  During his speech at the "Net.abusers       |#|
|#|                  Society Luncheon" during the          |#|
|#|                  "1990 Net idiots Annual Convention"       |#|
|#|_________________________________________________________________________|#|
|#|                                    |#|
|#| Thomas Babbit, III. 5th Assistant to the Vice President of Sales   |#|
|#|    __                                  |#|
|#| =========     _____            Digital Widget Manufacturing Co  |#|
|#|      \\   /             1147 Complex Incorporated Drive  |#|
|#|      )-======                 Suite 215              |#|
|#|                        Nostromo, VA 22550-1147        |#|
|#| #NC-17 Enterpoop Ship ·)        Phone # 804-844-2525          |#|
|#|   ----------------             Fax # 804-411-1115          |#|
|#| "Shut up, Wesley!"          Online Service # 804-411-1100    |#|
|#|                -- Me          at 300-2400, and now 9600 baud!   |#|
|#|                        PUNet: tbabb!digwig!nostromo       |#|
|#| Home address·               InterNet. dvader@imperial.emp com |#|
|#| Thomas Babbit, III            Prodigy: Still awaiting author-   |#|
|#| 104 Luzyer Way                    ization           |#|
|#| Sulaco, VA 22545              "Manufacturing educational widget |#|
|#| Phone # 804-555-1524           design for over 3 years  "    |#|
|#|==========================================================================
=|#|
|#|                                   |#|
|#| Introducing.                              |#|
|#|                                          |#|
|#| The  |\ /|                 _____                |#|
|#|      | V |                     /                   |#|
|#|      | V |                  /                   |#|
|#|     |  |                /                  |#|
|#|     |  |               /                   |#|
|#|     |  | ETELHED       /_____ ONE                  |#|
|#|"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'"'|#|
|#| 50Megs Online!  The k00l BBS for rad teens!  Lots of games and many |#|
|#| bases for kul topix!  Call now and be validated to the Metelhed Zone|#|
|#|                -- 804-555-8500 --                  |#|
|#|\\\\\\\\\\\\\\\\\\\\\\\\\\\\V/////////////////////////////////////|#|
|#| "This is the end, my friend . "      -- The Doors                |#|
|#######################################################################|
--------------------------------------------------------------------------
Hit "b" to continue

Hahahha..  fooled u!
```

4 6 THE FIRST AMENDMENT AS LOCAL ORDINANCE

Usenet's international reach raises interesting legal questions that have yet to be fully resolved Can a discussion or posting that is legal in one country be transmitted to a country where it is against the law? Does the posting even become illegal when it reaches the border? And what if that country is the only path to a third country where the message is legal as well? Several foreign colleges and other institutions have cut off feeds of certain newsgroups where Americans post what is, in the U.S , perfectly legal discussions of drugs or alternative sexual practices Even in the U S , some universities have discontinued certain newsgroups their administrators find offensive, again, usually in the alt hierarchy

An interesting example of this sort of question happened in 1993, when a Canadian court issued a gag order on Canadian reporters covering a particularly controversial murder case. Americans, not bound by the gag order, began posting accounts of the trial -- which any Canadian with a Net account could promptly read

4 7 USENET HISTORY

In the late 1970s, Unix developers came up with a new feature a system to allow Unix computers to exchange data over phone lines

In 1979, two graduate students at Duke University in North Carolina, Tom Truscott and Jim Ellis, came up with the idea of using this system, known as UUCP (for Unix-to-Unix CoPy), to distribute information of interest to people in the Unix community   Along with Steve Bellovin, a graduate student at the University of North Carolina and Steve Daniel, they wrote conferencing software and linked together computers at Duke and UNC

Word quickly spread and by 1981, a graduate student at Berkeley, Mark Horton and a nearby high school student, Matt Glickman, had released a new version that added more features and was able to handle larger volumes of postings -- the original North Carolina program was meant for only a few articles in a newsgroup each day

Today, Usenet connects tens of thousands of sites around the world, from mainframes to Amigas   With more than 3,000 newsgroups and untold thousands of readers, it is perhaps the world's largest computer network

4 8 WHEN THINGS GO WRONG

* When you start up rn, you get a "warning" that "bogus newsgroups" are present

Within a couple of minutes, you'll be asked whether to keep these or delete them. Delete them. Bogus newsgroups are newsgroups that your system administrator or somebody else has determined are no longer needed.

* While in a newsgroup in rn, you get a message "skipping unavailable article "

This is usually an article that somebody posted and then decided to cancel

* You upload a text file to your Unix host system for use in a Usenet message or e-mail, and when you or your recipient reads the file, every line ends with a ^M

This happens because Unix handles line endings differently than MS-DOS or Macintosh computers. Most Unix systems have programs to convert incoming files from other computers To use it, upload your file and then, at your command line, type

```
dos2unix filename filename  or
```

```
mac2unix filename filename
```

depending on which kind of computer you are using and where filename is the name of the file you've just uploaded. A similar program can prepare text files for downloading to your computer, for example:

```
unix2dos filename filename  or
```

```
unix2mac filename filename
```

will ensure that a text file you are about to get will not come out looking odd on your computer.

4.9 FYI

Leanne Phillips periodically posts a list of frequently asked questions (and answers) about use of the rn killfile function in the news newusers.questions and news answers newsgroups on Usenet Bill Wohler posts a guide to using the nn newsreader in the news answers and news software newsgroups. Look in the news announce newusers and news groups newsgroups on Usenet for "A Guide to Social Newsgroups and Mailing Lists," which gives brief summaries of the various soc newsgroups

"Managing UUCP and Usenet,' by Tim O'Reilly and Grace Todino (O'Reilly & Associates, 1992) is a good guide for setting up your own Usenet system

Chapter 6 TELNET

6 1 MINING THE NET

Like any large community, cyberspace has its libraries, places you can go to look up information or take out a good book Telnet is one of your keys to these libraries

Telnet is a program that lets you use the power of the Internet to connect you to databases, library catalogs, and other information resources around the world. Want to see what the weather's like in Vermont? Check on crop conditions in Azerbaijan? Get more information about somebody whose name you've seen online? Telnet lets you do this, and more

Alas, there's a big "but!" Unlike the phone system, Internet is not yet universal, not everybody can use all of its services. Almost all colleges and universities on the Internet provide telnet access So do all of the for-fee public-access systems listed in Chapter 1 But the Free-Net systems do not give you access to every telnet system And if you are using a public-access UUCP or Usenet site, you will not have access to telnet. The main reason for this is cost. Connecting to the Internet can easily cost $1,000 or more for a leased, high-speed phone line Some databases and file libraries can be queried by e-mail, however; we'll show you how to do that later on In the meantime, the rest of this chapter assumes you are connected to a site with at least partial Internet access.

Most telnet sites are fairly easy to use and have online help systems. Most also work best (and in some cases, only) with VT100 emulation. Let's dive right in and try one

At your host system's command line, type

```
telnet access usask ca
```

and hit enter That's all you have to do to connect to a telnet site! In this case, you'll be connecting to a service known as Hytelnet, which is a database of computerized library catalogs and other databases available through telnet You should see something like this:

```
Trying 128 233.3 1 ...
Connected to access usask ca.
Escape character is '^]'
```

```
Ultrix UNIX (access.usask ca)

login
```

Every telnet site has two addresses -- one composed of words that are easier for people to remember; the other a numerical address better suited for computers. The "escape character" is good to remember. When all else fails, hitting your control key and the] key at the same time will disconnect you and return you to your host system. At the login prompt, type

```
hytelnet
```

and hit enter. You'll see something like this:

```
                    Welcome to HYTELNET
                       version 6.2
                    .   . ..........

What is HYTELNET?       <WHATIS>    .    Up/Down arrows MOVE
Library catalogs      <SITES1>          Left/Right arrows SELECT
Other resources       <SITES2>          ? for HELP anytime
Help files for catalogs  <OP000>     .
Catalog interfaces     <SYS000>    .     m returns here
Internet Glossary      <GLOSSARY>          q quits
Telnet tips          <TELNET>
Telnet/TN3270 escape keys <ESCAPE.KEY>
Key-stroke commands     <HELP TXT>


                       . . . . . .
              HYTELNET 6 2 was written by Peter Scott,
        U of Saskatchewan Libraries, Saskatoon, Sask, Canada. 1992
     Unix and VMS software by Earl Fogel, Computing Services, U of S 1992
```

The first choice, "<WHATIS>" will be highlighted Use your down and up arrows to move the cursor among the choices. Hit enter when you decide on one You'll get another menu, which in turn will bring up text files telling you how to connect to sites and giving any special commands or instructions you might need Hytelnet does have one quirk To move back to where you started (for example, from a sub-menu to a main menu), hit the left-arrow key on your computer

Play with the system You might want to turn on your computer's

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```

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```
Trying 128 233 3 1  .
Connected to access usask ca.
Escape character is '^]'
```

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                       version 6.2
                        ...  .  ..

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Other resources        <SITES2>          ? for HELP anytime
Help files for catalogs  <OP000>     .
Catalog interfaces      <SYS000>          m returns here
Internet Glossary       <GLOSSARY>  .        q quits
Telnet tips           <TELNET>    .
Telnet/TN3270 escape keys <ESCAPE.KEY>
Key-stroke commands      <HELP.TXT>


                         ..
              HYTELNET 6 2 was written by Peter Scott,
        U of Saskatchewan Libraries, Saskatoon, Sask, Canada  1992
     Unix and VMS software by Earl Fogel, Computing Services, U of S 1992
```

The first choice, "<WHATIS>" will be highlighted Use your down and up arrows to move the cursor among the choices Hit enter when you decide on one You'll get another menu, which in turn will bring up text files telling you how to connect to sites and giving any special commands or instructions you might need Hytelnet does have one quirk To move back to where you started (for example, from a sub-menu to a main menu), hit the left-arrow key on your computer

Play with the system You might want to turn on your computer's screen-capture, or at the very least, get out a pen and paper. You're bound to run across some interesting telnet services that you'll want to try -- and you'll need their telnet "addresses "

As you move around Hytelnet, it may seem as if you haven't left your host system -- telnet can work that quickly. Occasionally, when network loads are heavy, however, you will notice a delay between the time you type a command or enter a request and the time the remote service responds

To disconnect from Hytelnet and return to your system, hit your q key and enter

Some telnet computers are set up so that you can only access them through a specific "port." In those cases, you'll always see a number after their name, for example india colorado edu 13. It's important to include that number, because otherwise, you may not get in.

In fact, try the above address Type

```
telnet india.colorado edu 13
```

and hit enter. You should see something like this:

```
Trying 128.138 140 44
```

Followed very quickly by this

```
telnet india colorado edu 13

Escape character is '^]'
Sun Jan 17 14 11.41 1994
Connection closed by foreign host
```

What we want is the middle line, which tells you the exact Mountain Standard Time, as determined by a government-run atomic clock in Boulder, Colo

6.2 LIBRARY CATALOGS

Several hundred libraries around the world, from the Snohomish Public Library in Washington State to the Library of Congress are now available to you through telnet You can use Hytelnet to find their names, telnet addresses and use instructions.

Why would you want to browse a library you can't physically get to? Many libraries share books, so if yours doesn't have what you're looking for, you can tell the librarian where he or she can get it Or if you live in an area where the libraries are not yet online, you can use telnet to do some basic bibliographic research before you head down to the local branch

There are several different database programs in use by online libraries Harvard's is one of the easier ones to use, so let's try it.

Telnet to hollis.harvard.edu. When you connect, you'll see

```
*****************     H A R V A R D   U N I V E R S I T Y
*****************      OFFICE FOR INFORMATION TECHNOLOGY
***   ***   ***
*** VE *** RI ***
***   ***   ***      HOLLIS   (Harvard OnLine LIbrary System)
 *****    *****
  **** TAS ****        HUBS    (Harvard University Basic Services)
    ***   ***
     *****         IU      (Information Utility)
      ***
                  CMS      (VM/CMS Timesharing Service)


      ** HOLLIS IS AVAILABLE WITHOUT ACCESS RESTRICTIONS **
  Access to other applications is limited to individuals who have been
  granted specific permission by an authorized person

  To select one of the applications above, type its name on the command
  line followed by your user ID, and press RETURN
           ** HOLLIS DOES NOT REQUIRE A USERID **

  EXAMPLES   HOLLIS (press RETURN)  or  HUBS userid (press RETURN)
===>
```

Type

```
hollis
```

and hit enter You'll see several screens flash by quickly until finally the system stops and you'll get this

```
                 WELCOME TO HOLLIS
        (Harvard OnLine Library Information System)

To begin, type one of the 2-character database codes listed below

     HU      Union Catalog of the Harvard libraries
```

```
   OW     Catalog of Older Widener materials
   LG     Guide to Harvard Libraries and Computing Resources

   AI     Expanded Academic Index (selective 1987-1988, full 1989- )
   LR     Legal Resource Index (1980- )
   PA     PAIS International (1985- )

To change databases from any place in HOLLIS, type CHOOSE followed by a
2-character database code, as in.  CHOOSE HU

For general help in using HOLLIS, type HELP   For HOLLIS news, type
HELP NEWS   For HOLLIS hours of operation, type HELP HOURS.

   ALWAYS PRESS THE ENTER OR RETURN KEY AFTER TYPING YOUR
COMMAND
```

The first thing to notice is the name of the system: Hollis Librarians around the world seem to be inordinately found of cutesy, anthropomorphized acronyms for their machines (not far from Harvard, the librarians at Brandeis University came up with Library On-Line User Information Service, or Louis, MIT has Barton).

If you want to do some general browsing, probably the best bet on the Harvard system is to choose HU, which gets you access to their main holdings, including those of its medical libraries. Choose that, and you'll see this

```
          THE HARVARD UNIVERSITY LIBRARY UNION CATALOG

To begin a search, select a search option from the list below and type its
code on the command line   Use either upper or lower case

        AU         Author search
        TI         Title search
        SU         Subject search
        ME         Medical subject search
        KEYWORD    Keyword search options
```

```
          CALL      Call number search options
          OTHER      Other search options

 For information on the contents of the Union Catalog, type HELP
 To exit the Union Catalog, type QUIT

 A search can be entered on the COMMAND line of any screen

     ALWAYS PRESS THE ENTER OR RETURN KEY AFTER TYPING YOUR
COMMAND
```

Say you want to see if Harvard has shed the starchy legacy of the Puritans, who founded the school. Why not see if they have "The Joy of Sex" somewhere in their stacks? Type

```
TI Joy of Sex
```

and hit enter. This comes up:

```
HU  YOUR SEARCH RETRIEVED NO ITEMS.  Enter new command or HELP.     You typed
 TI JOY OF SEX
*****************************************************************************
*




     ALWAYS PRESS THE ENTER OR RETURN KEY AFTER TYPING YOUR
COMMAND
-------------------------------------------------------------------------
OPTIONS: FIND              START - search options        HELP
                     QUIT - exit database
COMMAND?
```

Oh, well! Do they have anything that mentions "sex" in the title? Try another TI search, but this time just TI sex. You get:

```
HU GUIDE  SUMMARY OF SEARCH RESULTS      2086 items retrieved by your search
```

```
FIND TI SEX
--------------------------------------------------------------------------------
  1   SEX
  2   SEX A
823   SEXA
827   SEXBO
831   SEXCE
833   SEXDR
834   SEXE
879   SEXIE
928   SEXJA
929   SEXLE
930   SEXO
965   SEXPI
968   SEXT
1280  SEXUA
2084  SEXWA
2085  SEXY
--------------------------------------------------------------------------------
OPTIONS  INDEX (or I 5 etc) to see list of items        HELP
                                         START - search options
     REDO - edit search                          QUIT - exit database
COMMAND?
```

If you want to get more information on the first line, type 1 and hit enter:

```
 HU INDEX  LIST OF ITEMS RETRIEVED        2086 items retrieved by your search
FIND TI SEX
--------------------------------------------------------------------------------
SEX
  1 geddes patrick sir 1854 1932/ 1914  bks

SEX A Z
  2 goldenson robert m/ 1987  bks

SEX ABUSE HYSTERIA SALEM WITCH TRIALS REVISITED
  3 gardner richard a/ 1991  bks

SEX AETATES MUNDI ENGLISH AND IRISH
  4 irish sex aetates mundi/ 1983  bks

SEX AFTER SIXTY A GUIDE FOR MEN AND WOMEN FOR THEIR LATER YEARS

  5 butler robert n 1927/ 1976  bks
```

```
---------------------------------------------------- (CONTINUES) ------------
OPTIONS  DISPLAY 1 (or D 5 etc) to see a record        HELP
      GUIDE              MORE - next page        START - search options
      REDO - edit search                     QUIT - exit database
COMMAND?
```

Most library systems give you a way to log off and return to your host system On Hollis, hit escape followed by

```
xx
```

One particularly interesting system is the one run by the Colorado Alliance of Research Libraries, which maintains databases for libraries throughout Colorado, the West and even in Boston.

Telnet pac.carl org

Follow the simple log-in instructions. When you get a menu, type 72 (even though that is not listed), which takes you to the Pikes Peak Library District, which serves the city of Colorado Springs

Several years ago, its librarians realized they could use their database program not just for books but for cataloging city records and community information, as well Today, if you want to look up municipal ordinances or city records, you only have to type in the word you're looking for and you'll get back cites of the relevant laws or decisions

Carl will also connect you to the University of Hawaii library, which, like the one in Colorado Springs, has more than just bibliographic material online. One of its features is an online Hawaiian almanac that can tell you everything you ever wanted to know about Hawaiians, including the number injured in boogie-board accidents each year (seven)

6 3 SOME INTERESTING TELNET SITES

AGRICULTURE

PENPages, run by Pennsylvania State University's College of Agricultural Sciences, provides weekly world weather and crop reports from the U S Department of Agriculture These reports detail everything from the effect of the weather on palm trees in Malaysia to the state of the Ukrainian wheat crop Reports from Pennsylvania country extension officers offer tips for improving farm life One database lists Pennsylvania hay distributors by county -- and rates the quality of their hay!

The service lets you search for information two different ways. A menu system gives you quick access to reports that change frequently, such as the weekly crop/weather reports. An index system lets you search through several thousand online documents by keyword At the main menu, you can either browse through an online manual or choose "PENPages," which puts you into the agriculture system.
Telnet psupen psu.edu
User name Your 2-letter state code or WORLD

California State University's Advanced Technology Information Network provides similar information as PENPages, only focusing on California crops It also maintains lists of upcoming California trade shows and carries updates on biotechnology
Telnet caticsuf cati.csufresno.edu
Log in public

You will then be asked to register and will be given a user name and password Hit "a" at the main menu for agricultural information Hit "d" to call up a menu that includes a biweekly biotechnology report.

AIDS

The University of Miami maintains a database of AIDS health providers in southern Florida
Telnet: callcat med miami edu
Log in library

At the main menu, select P (for "AIDS providers" and you'll be able to search for doctors, hospitals and other providers that care for patients with AIDS You can also search by speciality.

See also under Conversation and Health

AMATEUR RADIO

The National Ham Radio Call-Sign Callbook lets you search for American amateur operators by callsign, city, last name or Zip code. A successful search will give you the ham's name, address, callsign, age, type of license and when he or she got it.
Telnet: callsign cs.buffalo edu 2000 or ham.njit edu 2000.
When you connect, you tell the system how you want to search and what you're looking for. For example, if you want to search for hams

by city, you would type

```
city city name
```

and hit enter (for example: city Kankakee).

Other search choices are "call" (after which you would type a ham's name), "name," and "zip" (which you would follow with a Zip code). Be careful when searching for hams in a large city, there doesn't seem to be anyway to shut off the list once it starts except by using control-]. Otherwise, when done, type

```
quit
```

and hit enter to disconnect.

ANIMALS

See under Health.

CALCULATORS

Hewlett-Packard maintains a free service on which you can seek advice about their line of calculators.

Telnet hpcvbbs.cv.hp.com

No log-in is needed

CHEMISTRY

The Electronic Periodic Table of the Elements draws the table on your screen and then lets you look up various properties of individual elements.

Telnet camms2.caos.kun.nl

No password needed

CONGRESS

The Library of Congress Information Service lets you search current and past legislation (dating to 1982).

Telnet locis.loc.gov

Password: none needed

When you connect, you'll get a main menu that lets you select from several databases, including the Library of Congress card catalog (with book entries dating to 1978) and a database of information on copyright laws.

For the congressional database, select the number next to its entry and hit enter. You'll then be asked to choose which legislative year to search After that, a menu similar to this will come up:

```
 ***C103- THE LEGISLATIVE INFORMATION FILE FOR THE 103RD CONGRESS
       which was updated on 05/10/93 and contains 4,044 records,
       is now available for your search

  CURRENCY  All information is NOT current through the above date, which is
         machine generated when ANY information is added to the file
         Bill numbers, official titles, sponsors, and status (STEP) added
         within 48 hours  Indexing terms and digests added later, in
         some cases several weeks after the bill is added to the file

  TO START   RETRIEVE to find              EXAMPLES
  SEARCH     member name -------------->  retrieve rep gingrich
                                 retrieve sen kennedy
          bill number -------------->  retrieve h.r  1
          subject keywords --------->   retrieve day care

  FOR HELP:  Type the word HELP and press the ENTER key


  READY FOR NEW COMMAND·
```

CONVERSATION

Communications Canada, a Canadian government agency is developing Conversational Hypertext Access Technology (CHAT) is a system being developed by Communications Canada to provide easy database access to people with little or no computer experience, using what are known as hypertext links Instead of cryptic computer commands, users type questions in English.

Telnet   debra.doc.ca
Log in   chat

You choose one of the three databases now online, one on AIDS, and then ask questions in English

Ask the AIDS database, "When was AIDS first discovered?" and it answers.

"The first case of AIDS in North America was diagnosed in 1979 Before that, it existed in Africa, probably beginning in the 1950's AIDS was discovered in North America when a number of young men with a history of homosexuality developed a rare type of cancer called Kaposi's sarcoma."

Sometimes, you do have to rephrase your question. For example, when asked "What is the link between AIDS and drug use?" the computer responds

"I know two things about drugs the drugs that are used to treat people with AIDS, and the risks that drug users have in getting AIDS Please ask about treatments or drug users "

COPYRIGHT LAW

See under Congress

CURRENT EVENTS

Every year, the CIA publishes a Fact Book that is essentially an almanac of all the world's countries and international organizations, including such information as major products, type of government and names of its leaders It's available for searching through the University of Maryland Info Database

Telnet. info.umd edu

Choose a terminal type and hit enter (or just hit enter if you are using VT100) At the main menu, choose the number next to "Educational Resources " Then select the number next to "International," followed by "Factbook " You can then search by country or agency

This site also maintains copies of the U.S budget, documents related to the North American Free Trade Agreement and other government initiatives At the "Educational Resources" menu, select the number next to "United States" and then the one next to "Government "

The Access Legislative Information Service lets you browse through and look up bills before the Hawaiian legislature

Telnet access.uhcc hawaii edu

ENVIRONMENT

Envirolink is a large database and conference system about the environment, based in Pittsburgh

Telnet envirolink.org

Log on gopher

The U S Environmental Protection Agency maintains online databases of materials related to hazardous waste, the Clean Lakes program and cleanup efforts in New England The agency plans to eventually include cleanup work in other regions, as well The database is actually a computerized card catalog of EPA documents -- you can look the documents up, but you'll still have to visit your

regional EPA office to see them
Telnet: epaibm rtpnc epa.gov
No password or user name is needed At the main menu, type

```
public
```

and hit enter (there are other listed choices, but they are only for use by EPA employees) You'll then see a one-line menu Type

```
ols
```

and hit enter, and you'll see something like this:

```
NET-106 Logon to TSO04    in progress

  DATABASES
    N   NATIONAL CATALOG      CH   CHEMICAL COLL  SYSTEM
    H   HAZARDOUS WASTE       1    REGION I
    L   CLEAN LAKES

  OTHER OPTIONS
    ?   HELP
    Q   QUIT

 ENTER SELECTION -->
```

Choose one and you'll get a menu that lets you search by document title, keyword, year of publication or corporation After you enter the search word and hit enter, you'll be told how many matches were found Hit 1 and then enter to see a list of the entries To view the bibliographic record for a specific entry, hit V and enter and then type the number of the record.

The University of Michigan maintains a database of newspaper and magazine articles related to the environment, with the emphasis on Michigan, dating back to 1980.
Telnet. hermes merit.edu
Host mirlyn
Log in. meem

GEOGRAPHY

The University of Michigan Geographic Name Server can provide basic information, such as population, latitude and longitude of U.S cities and many mountains, rivers and other geographic features.

Telnet martini eecs.umich.edu 3000

No password or user name is needed Type in the name of a city, a Zip code or a geographic feature and hit enter. The system doesn't like names with abbreviations in them (for example, Mt. McKinley), so spell them out (for example, Mount McKinley)

By typing in a town's name or zip code, you can find out a community's county, Zip code and longitude and latitude Not all geographic features are yet included in the database

GOVERNMENT

The National Technical Information Service runs a system that not only provides huge numbers of federal documents of all sorts -- from environmental factsheets to patent abstract -- but serves as a gateway to dozens of other federal information systems

Telnet fedworld gov
Log on as: new

See also under Congress and Current Events

HEALTH

The U S Food and Drug Administration runs a database of health-related information

Telnet fdabbs fda gov
Log in bbs

You'll then be asked for your name and a password you want to use in the future After that, type

```
topics
```

and hit enter You'll see this

```
TOPICS     DESCRIPTION

* NEWS        News releases
* ENFORCE     Enforcement Report
* APPROVALS   Drug and Device Product Approvals list
* CDRH        Centers for Devices and Radiological Health Bulletins
* BULLETIN    Text from Drug Bulletin
* AIDS        Current Information on AIDS
* CONSUMER    FDA Consumer magazine index and selected articles
* SUBJ-REG    FDA Federal Register Summaries by Subject
* ANSWERS     Summaries of FDA information
* INDEX      Index of News Releases and Answers
* DATE-REG     FDA Federal Register Summaries by Publication Date
* CONGRESS     Text of Testimony at FDA Congressional Hearings
* SPEECH      Speeches Given by FDA Commissioner and Deputy
* VETNEWS      Veterinary Medicine News
* MEETINGS     Upcoming FDA Meetings
* IMPORT      Import Alerts
* MANUAL      On-Line User's Manual
```

You'll be able to search these topics by key word or chronologically It's probably a good idea, however, to capture a copy of the manual, first, because the way searching works on the system is a little odd To capture a copy, type

```
manual
```

and hit enter Then type

```
scan
```

and hit enter You'll see this:

```
FOR LIST OF AVAILABLE TOPICS TYPE TOPICS
OR ENTER THE TOPIC YOU DESIRE ==>

MANUAL
BBSUSER
08-OCT-91
1 BBS User Manual
```

At this point, turn on your own computer's screen-capture or logging function and hit your 1 key and then enter The manual will begin to scroll on your screen, pausing every 24 lines.

HIRING AND COLLEGE PROGRAM INFORMATION

The Federal Information Exchange in Gaithersburg, MD, runs two systems at the same address. FEDIX and MOLIS. FEDIX offers research, scholarship and service information for several federal agencies, including NASA, the Department of Energy and the Federal Aviation Administration Several more federal agencies provide minority hiring and scholarship information MOLIS provides information about minority colleges, their programs and professors.

Telnet. fedix.fie.com
User name: fedix (for the federal hiring database) or

molis (for the minority-college system)
Both use easy menus to get you to information

HISTORY

Stanford University maintains a database of documents related to Martin Luthor King
Telnet forsythetn.stanford edu
Account: socrates

At the main menu, type

select mlk

and hit enter

SKI REPORTS

See under weather

SPACE

NASA Spacelink in Huntsville, Ala , provides all sorts of reports and data about NASA, its history and its various missions, past and present You'll find detailed reports on every single probe, satellite and mission NASA has ever launched along with daily updates and lesson plans for teachers.

The system maintains a large file library of GIF-format space graphics, but you can't download these through telnet If you want them, you have to dial the system directly, at (205) 895-0028
Telnet: spacelink msfc.nasa gov
When you connect, you'll be given an overview of the system and asked to register and choose a password

The NED-NASA/IPAC Extragalactic Database lists data on more than 100,000 galaxies, quasars and other objects outside the Milky Way
Telnet ipac caltech edu
Log in ned

You can learn more than you ever wanted to about quasars, novae and related objects on a system run by the Smithsonian Astrophysical Observatory in Cambridge, Mass
Telnet cfa204.harvard edu
Log in einline

The physics department at the University of Massachusetts at Amherst runs a bulletin-board system that provides extensive conferences and document libraries related to space

Telnet spacemet phast umass edu

Log on with your name and a password

SUPREME COURT DECISIONS

The University of Maryland Info Database maintains U.S Supreme Court decisions from 1991 on

Telnet: info.umd edu

Choose a terminal type and hit enter (or just hit enter if you are using VT100). At the main menu, choose the number next to "Educational Resources" and hit enter. One of your options will then be for "United States " Select that number and then, at the next menu, choose the one next to "Supreme Court "

TELNET

Hytelnet, at the University of Saskatchewan, is an online guide to hundreds of telnet sites around the world.

Telnet. access usask ca

Log in· hytelnet

TIME

To find out the exact time·

Telnet india.colorado edu 13

You'll see something like this

```
Escape character is '^]'
Sun Apr  5 14:11:41 1992
Connection closed by foreign host
```

The middle line tells you the date and exact Mountain Standard Time, as determined by a federal atomic clock.

TRANSPORTATION

The Subway Navigator in Paris can help you learn how long it will take to get from point A to point B on subway systems around the world.

Telnet: metro jussieu.fr 10000

No log-in is needed

When you connect, you'll be asked to choose a language in which to search (you can choose English or French) and then a city to search You'll be asked for the station you plan to leave from and the station you want to get to.

WEATHER

The University of Michigan's Department of Atmospheric, Oceanographic and Space Sciences supplies weather forecasts for U.S and foreign cities, along with skiing and hurricane reports.

Telnet madlab.sprl.umich.edu 3000 (note the 3000)

No log-in name is needed.

Also see under Weather in the FTP list for information on downloading satellite and radar weather images.

6 4 TELNET BULLETIN-BOARD SYSTEMS

You might think that Usenet, with its hundreds of newsgroups, would be enough to satisfy the most dedicated of online communicators.

But there are a number of "bulletin-board" and other systems that provide even more conferences or other services, many not found directly on the Net. Some are free; others charge for access They include:

Bookstacks Unlimited is a Cleveland bookstore that uses the Internet to advertise its services. Its online system features not only a catalog, however, but conferences on books and literature

Telnet books com

Log in with your own name and select a password for future connections.

Cimarron Run by the Instituto Technical in Monterey, Mexico, this system has Spanish conferences, but English commands, as you can see from this menu of available conferences

```
List of Boards
 Name           Title
 General        Board general
 Dudas          Dudas de Cimarron
 Comentarios      Comentarios al SYSOP
 Musica         Para los afinados  . ..
 Libros         El sano arte de leer  ..
 Sistemas        Sistemas Operativos en General
```

Virus	Su peor enemigo ..
Cultural	Espacio Cultural de Cimarron
NeXT	El Mundo de NeXT
Ciencias	Solo apto para Nerds.
Inspiracion	Para los Romanticos e Inspirados.
Deportes	Discusiones Deportivas

To be able to write messages and gain access to files, you have to leave a note to SYSOP with your name, address, occupation and phone number To do this, at any prompt, hit your M key and then enter, which will bring up the mail system. Hitting H brings up a list of commands and how to use them

Telnet: bugs mty itesm mx (8 p m to 10 a.m., Eastern time, only)
At the "login." prompt, type

```
bbs
```

and hit enter

Cleveland Free-Net. The first of a series of Free-nets, this represents an ambitious attempt to bring the Net to the public. Originally an in-hospital help network, it is now sponsored by Case Western Reserve University, the city of Cleveland, the state of Ohio and IBM It uses simple menus, similar to those found on CompuServe, but organized like a city

```
<<< CLEVELAND FREE-NET DIRECTORY >>>

  1 The Administration Building
  2 The Post Office
  3 Public Square
  4 The Courthouse & Government Center
  5 The Arts Building
  6 Science and Technology Center
  7 The Medical Arts Building
  8 The Schoolhouse (Academy One)
  9 The Community Center & Recreation Area
  10 The Business and Industrial Park
  11 The Library
  12 University Circle
  13 The Teleport
  14 The Communications Center
  15 NPTN/USA TODAY HEADLINE NEWS
 -----------------------------------------------
 h=Help, x=Exit Free-Net, "go help"=extended help
```

Your Choice ==>

The system has a vast and growing collection of public documents, from copies of U.S. and Ohio Supreme Court decisions to the Magna Carta and the U.S. Constitution. It links residents to various government agencies and has daily stories from USA Today. Beyond Usenet (found in the Teleport area), it has a large collection of local conferences on everything from pets to politics. And yes, it's free!

Telnet: freenet-in-a.cwru.edu or
freenet-in-b.cwru.edu or
freenet-in-c.cwru.edu

When you connect to Free-Net, you can look around the system. However, if you want to be able to post messages in its conferences or use e-mail, you will have to apply in writing for an account. Information on this is available when you connect.

DUBBS. This is a bulletin-board system in Delft in the Netherlands. The conferences and files are mostly in Dutch, but the help files and the system commands themselves are in English.

Telnet: tudrwa.tudelft.nl

ISCA BBS. Run by the Iowa Student Computer Association, it has more than 100 conferences, including several in foreign languages. After you register, hit K for a list of available conferences and then J to join a particular conference (you have to type in the name of the conference, not the number next to it). Hitting H brings up information about commands.

Telnet: bbs.isca.uiowa.edu

At the "login:" prompt, type

bbs

and hit enter.

Youngstown Free-Net. The people who created Cleveland Free-Net sell their software for $1 to anybody willing to set up a similar system. A number of cities now have their own Free-Nets, including Youngstown, Ohio. Telnet: yfn.ysu.edu At the "login:" prompt, type

visitor

and hit enter

6 5 PUTTING THE FINGER ON SOMEONE

Finger is a handy little program which lets you find out more about people on the Net -- and lets you tell others on the Net more about yourself

Finger uses the same concept as telnet or ftp But it works with only one file, called plan (yes, with a period in front). This is a text file an Internet user creates with a text editor in his home directory You can put your phone number in there, tell a little bit about yourself, or write almost anything at all.

To finger somebody else's plan file, type this at the command line

```
finger email-address
```

where email-address is the person's e-mail address. You'll get back a display that shows the last time the person was online, whether they've gotten any new mail since that time and what, if anything, is in their plan file

Some people and institutions have come up with creative uses for these plan files, letting you do everything from checking the weather in Massachusetts to getting the latest baseball standings. Try fingering these e-mail addresses

weather@cirrus mit edu	Latest National Weather Service weather forecasts for regions in Massachusetts
quake@geophys washington edu	Locations and magnitudes of recent earthquakes around the world
jtchern@ocf berkeley edu	Current major-league baseball standings and results of the previous day's games.
nasanews@space.mit.edu	The day's events at NASA.
coke@cs cmu edu	See how many cans of each type of soda are left in a particular soda machine in the computer-science department of Carnegie-Mellon University

6 6 FINDING SOMEONE ON THE NET

So you have a friend and you want to find out if he has an Internet account to which you can write? The quickest way may be to just pick up the phone, call him and ask him Although there are a variety of "white pages" services available on the Internet, they are far from complete -- college students, users of commercial services such as CompuServe and many Internet public-access sites, and many others simply won't be listed Major e-mail providers are working on a universal directory system, but that could be some time away.

In the meantime, a couple of "white pages" services might give you some leads, or even just entertain you as you look up famous people or long-lost acquaintances.

The whois directory provides names, e-mail and postal mail address and often phone numbers for people listed in it To use it, telnet to

```
internic.net
```

No log-on is needed The quickest way to use it is to type

```
whois name
```

at the prompt, where "name" is the last name or organization name you're looking for.

Another service worth trying, especially since it seems to give beginners fewer problems, is the Knowbot Information Service reachable by telnet at

```
info cnri reston va us 185
```

Again, no log-on is needed. This service actually searches through a variety of other "white pages" systems, including the user directory for MCIMail To look for somebody, type

```
query name
```

where "name" is the last name of the person you're looking for You can get details of other commands by hitting a question mark at the prompt

You can also use the knowbot system by e-mail Start a message to

```
netaddress@info cnri reston va us
```

You can leave the "subject " line blank As your message, type

Chapter 7· FTP

7 1 TONS OF FILES

Hundreds of systems connected to Internet have file libraries, or archives, accessible to the public Much of this consists of free or low-cost shareware programs for virtually every make of computer If you want a different communications program for your IBM, or feel like playing a new game on your Amiga, you'll be able to get it from the Net

But there are also libraries of documents as well. If you want a copy of a recent U S Supreme Court decision, you can find it on the Net Copies of historical documents, from the Magna Carta to the Declaration of Independence are also yours for the asking, along with a translation of a telegram from Lenin ordering the execution of rebellious peasants. You can also find song lyrics, poems, even summaries of every "Lost in Space" episode ever made. You can also find extensive files detailing everything you could ever possibly want to know about the Net itself First you'll see how to get these files; then we'll show you where they're kept.

The commonest way to get these files is through the file transfer protocol, or ftp As with telnet, not all systems that connect to the Net have access to ftp However, if your system is one of these, you'll be able to get many of these files through e-mail (see the next chapter)

Starting ftp is as easy as using telnet At your host system's command line, type

```
ftp site name
```

and hit enter, where "site.name" is the address of the ftp site you want to reach One major difference between telnet and ftp is that it is considered bad form to connect to most ftp sites during their business hours (generally 6 a m to 6 p m. local time). This is because transferring files across the network takes up considerable computing power, which during the day is likely to be needed for whatever the computer's main function is. There are some ftp sites that are accessible to the public 24 hours a day, though. You'll find these noted in the list of ftp sites in section 7 6

7 2 YOUR FRIEND ARCHIE

How do you find a file you want, though?

Until a few years ago, this could be quite the pain -- there was no master directory to tell you where a given file might be stored on the Net Who'd want to slog through hundreds of file libraries looking for something?

Alan Emtage, Bill Heelan and Peter Deutsch, students at McGill University in Montreal, asked the same question. Unlike the weather, though, they did something about it

They created a database system, called archie, that would periodically call up file libraries and basically find out what they had available In turn, anybody could dial into archie, type in a file name, and see where on the Net it was available. Archie currently catalogs close to 1,000 file libraries around the world.

Today, there are three ways to ask archie to find a file for you. through telnet, "client" Archie program on your own host system or e-mail. All three methods let you type in a full or partial file name and will tell you where on the Net it's stored.

If you have access to telnet, you can telnet to one of the following addresses: archie.mcgill ca; archie.sura.net, archie.unl.edu; archie ans.net; or archie.rutgers.edu. If asked for a log-in name, type

```
archie
```

and hit enter

When you connect, the key command is prog, which you use in this form

```
prog filename
```

followed by enter, where "filename" is the program or file you're looking for. If you're unsure of a file's complete name, try typing in part of the name. For example, "PKZIP" will work as well as "PKZIP204 EXE " The system does not support DOS or Unix wildcards If you ask archie to look for "PKZIP*," it will tell you it couldn't find anything by that name. One thing to keep in mind is that a file is not necessarily the same as a program -- it could also be a document This means you can use archie to search for, say, everything online related to the Beetles, as well as computer programs and graphics files

A number of Net sites now have their own archie programs that take your request for information and pass it onto the nearest archie database -- ask your system administrator if she has it online These "client" programs seem to provide information a lot more quickly than the actual archie itself? If it is available, at your host system's command line, type

```
archie -s filename
```

```
query name
```

for the simplest type of search. If you want details on more complex searches, add another line

```
man
```

Another way to search is via the Usenet name server This is a system at MIT that keeps track of the e-mail addresses of everybody who posts a Usenet message that appears at MIT It works by e-mail Send a message to

```
mail-server@rtfm.mit.edu
```

Leave the "subject:" line blank. As your message, write

```
send usenet-addresses/lastname
```

where "lastname" is the last name of the person you're looking for.

6.7 WHEN THINGS GO WRONG

* Nothing happens when you try to connect to a telnet site.
The site could be down for maintenance or problems.
* You get a "host unavailable" message The telnet site is down for some reason.
Try again later
* You get a "host unknown" message
Check your spelling of the site name
* You type in a password on a telnet site that requires one, and you get a "login incorrect" message
Try logging in again. If you get the message again, hit your control and] keys at the same time to disengage and return to your host system.
* You can't seem to disconnect from a telnet site
Use control-] to disengage and return to your host system.

6.8 FYI

The Usenet newsgroups alt.internet.services and alt.bbs.internet can provide pointers to new telnet systems Scott Yanoff periodically posts his "Updated Internet Services List" in the former. The alt.bbs.internet newsgroup is also where you'll find Aydin Edguer's compendium of FAQs related to Internet bulletin-board systems

Peter Scott, who maintains the Hytelnet database, runs a mailing list about new telnet services and changes in existing ones To get on the list, send him a note at scott@sklib.usask.ca.

Gleason Sackman maintains another mailing list dedicated to new Internet services and news about the new uses to which the Net is being put. To subscribe, send a message to listserv@internic net Leave the "subject " line blank, and as your message, write. Sub net-happenings Your Name where filename is the program or document you're looking for, and hit enter The -s tells the program to ignore case in a file name and lets you search for partial matches You might actually want to type it this way

```
archie -s filename|more
```

which will stop the output every screen (handy if there are many sites that carry the file you want). Or you could open a file on your computer with your text-logging function

The third way, for people without access to either of the above, is e-mail

Send a message to archie@quiche.cs mcgill ca. You can leave the subject line blank Inside the message, type

```
prog filename
```

where filename is the file you're looking for You can ask archie to look up several programs by putting their names on the same "prog" line, like this:

```
prog file1 file2 file3
```

Within a few hours, archie will write back with a list of the appropriate sites

In all three cases, if there is a system that has your file, you'll get a response that looks something like this

```
Host sumex-aim stanford edu

   Location: /info-mac/comm
       FILE -rw-r--r--    258256  Feb 15 17.07  zterm-09 hqx
   Location  /info-mac/misc
       FILE -rw-r--r--      7490  Sep 12 1991  zterm-sys7-color-icons hqx
```

Chances are, you will get a number of similar looking responses for each program. The "host" is the system that has the file. The "Location" tells you which directory to look in when you connect to that system. Ignore the funny-looking collections of r's and hyphens for now. After them, come the size of the file or directory listing in bytes, the date it was uploaded, and the name of the file

7.3 GETTING THE FILES

Now you want to get that file.

Assuming your host site does have ftp, you connect in a similar fashion to telnet, by typing:

```
ftp sumex-aim.stanford edu
```

(or the name of whichever site you want to reach). Hit enter. If the connection works, you'll see this.

```
Connected to sumex-aim.stanford edu.
220 SUMEX-AIM FTP server (Version 4.196 Mon Jan 13 13 52.23 PST 1992) ready.
Name (sumex-aim.stanford.edu:adamg):
```

If nothing happens after a minute or so, hit control-C to return to your host system's command line. But if it has worked, type

```
anonymous
```

and hit enter. You'll see a lot of references on the Net to "anonymous ftp." This is how it gets its name -- you don't really have to tell the library site what your name is The reason is that these sites are set up so that anybody can gain access to certain public files, while letting people with accounts on the sites to log on and access their own personal files Next, you'll be asked for your password As a password, use your e-mail address This will then come up

```
230 Guest connection accepted. Restrictions apply.
Remote system type is UNIX
Using binary mode to transfer files.
ftp>
```

Now type

```
ls
```

and hit enter You'll see something awful like this:

```
200 PORT command successful
150 Opening ASCII mode data connection for /bin/ls.
total 2636
-rw-rw-r-- 1 0      31      4444 Mar  3 11:34 README.POSTING
```

```
dr-xr-xr-x  2 0       1          512 Nov  8 11 06 bin
-rw-r--r--  1 0       0     11030960 Apr  2 14.06 core
dr--r--r--  2 0       1          512 Nov  8 11 06 etc
drwxrwsr-x  5 13      22          512 Mar 19 12 27 imap
drwxr-xr-x 25 1016    31           512 Apr  4 02·15 info-mac
drwxr-x---  2 0       31        1024 Apr  5 15 38 pid
drwxrwsr-x 13 0       20         1024 Mar 27 14 03 pub
drwxr-xr-x  2 1077    20          512 Feb  6  1989 tmycin
226 Transfer complete
ftp>
```

Ack! Let's decipher this Rosetta Stone

First, ls is the ftp command for displaying a directory (you can actually use dir as well, but if you're used to MS-DOS, this could lead to confusion when you try to use dir on your host system, where it won't work, so it's probably better to just remember to always use ls for a directory while online).

The very first letter on each line tells you whether the listing is for a directory or a file. If the first letter is a ``d," or an "l", it's a directory Otherwise, it's a file

The rest of that weird set of letters and dashes consist of "flags" that tell the ftp site who can look at, change or delete the file. You can safely ignore it. You can also ignore the rest of the line until you get to the second number, the one just before the date. This tells you how large the file is, in bytes. If the line is for a directory, the number gives you a rough indication of how many items are in that directory -- a directory listing of 512 bytes is relatively small. Next comes the date the file or directory was uploaded, followed (finally!) by its name.

Notice the README POSTING file up at the top of the directory. Most archive sites have a "read me" document, which usually contains some basic information about the site, its resources and how to use them. Let's get this file, both for the information in it and to see how to transfer files from there to here. At the ftp> prompt, type

```
get README
```

and hit enter Note that ftp sites are no different from Unix sites in general they are case-sensitive You'll see something like this:

```
200 PORT command successful
150 Opening BINARY mode data connection for README (4444 bytes)
226 Transfer complete  4444 bytes received in 1.177seconds (3 8 Kbytes/s)
```

And that's it! The file is now located in your home directory on your host system, from which you can now download it to your own computer The simple "get" command is the key to transferring a file from an archive site to your host system.

If you want to download more than one file at a time (say a series of documents, use mget instead of get; for example:

```
mget * txt
```

This will transfer copies of every file ending with txt in the given directory Before each file is copied, you'll be asked if you're sure you want it Despite this, mget could still save you considerable time -- you won't have to type in every single file name. If you want to save even more time, and are sure you really want ALL of the given files, type

```
prompt
```

before you do the mget command. This will turn off the prompt, and all the files will be zapped right into your home directory.

There is one other command to keep in mind If you want to get a copy of a computer program, type

```
bin
```

and hit enter. This tells the ftp site and your host site that you are sending a binary file, i.e., a program. Most ftp sites now use binary format as a default, but it's a good idea to do this in case you've connected to one of the few that doesn't.

To switch to a directory, type

```
cd directory-name
```

(substituting the name of the directory you want to access) and hit enter Type

```
ls
```

and hit enter to get the file listing for that particular directory. To move back up the directory tree, type

```
cd
```

(note the space between the d and the first period) and hit enter. Or you could type

```
cdup
```

and hit enter Keep doing this until you get to the directory of interest. Alternately, if you already know the directory path of the file you want (from our friend archie), after you connect, you could simply type

```
get directory/subdirectory/filename
```

On many sites, files meant for public consumption are in the pub or public directory, sometimes you'll see an info directory

Almost every site has a bin directory, which at first glance sounds like a bin in which interesting stuff might be dumped But it actually stands for "binary" and is simply a place for the system administrator to store the programs that run the ftp system Lost+found is another directory that looks interesting but actually never has anything of public interest in them.

Before, you saw how to use archie. From our example, you can see that some system administrators go a little berserk when naming files Fortunately, there's a way for you to rename the file as it's being transferred. Using our archie example, you'd type

```
get zterm-sys7-color-icons.hqx zterm.hqx
```

and hit enter Instead of having to deal constantly with a file called zterm-sys7-color-icons.hqx, you'll now have one called, simply, zterm.hqx.

Those last three letters bring up something else. Many program files are compressed to save on space and transmission time. In order to actually use them, you'll have to use an un-compress program on them first

7.4 ODD LETTERS -- DECODING FILE ENDINGS

There are a wide variety of compression methods in use. You can tell which method was used by the last one to three letters at the end of a file Here are some of the more common ones and what you'll need to un-compress the files they create (most of these decompression programs can be located through archie)

txt or .TXT By itself, this means the file is a document, rather than a program.

.ps or .PS A PostScript document (in Adobe's page description language) You can print this file on any PostScript capable printer, or use a previewer, like GNU project's GhostScript

.doc or .DOC Another common "extension" for documents No decompression is needed, unless it is followed by:

.Z This indicates a Unix compression method To uncompress, type

```
uncompress filename.Z
```

and hit enter at your host system's command line. If the file is a compressed text file, you can read it online by instead typing

```
zcat filename txt.Z |more
```

u16.zip is an MS-DOS program that will let you download such a file and uncompress it on your own computer. The Macintosh equivalent program is called MacCompress (use archie to find these)

zip or ZIP These indicate the file has been compressed with a common MS-DOS compression program, known as PKZIP (use archie to find PKZIP204 EXE) Many Unix systems will let you un-ZIP a file with a program called, well, unzip.

.gz A Unix version of ZIP. To uncompress, type

```
gunzip filename gz
```

at your host system's command line

zoo or ZOO A Unix and MS-DOS compression format Use a program called zoo to uncompress

.Hqx or .hqx Macintosh compression format. Requires the BinHex program.

shar or Shar Another Unix format Use unshar to uncompress

.tar Another Unix format, often used to compress several related files into one large file. Most Unix systems will have a

	program called tar for "un-tarring" such files. Often, a "tarred" file will also be compressed with the gz method, so you first have to use uncompress and then tar
sit or Sit	A Macintosh format that requires the StuffIt program.
ARC	Another MS-DOS format, which requires the use of the ARC or ARCE programs.
LHZ	Another MS-DOS format, requires the use of LHARC.

A few last words of caution Check the size of a file before you get it The Net moves data at phenomenal rates of speed But that 500,000-byte file that gets transferred to your host system in a few seconds could take more than an hour or two to download to your computer if you're using a 2400-baud modem Your host system may also have limits on the amount of bytes you can store online at any one time Also, although it is really extremely unlikely you will ever get a file infected with a virus, if you plan to do much downloading over the Net, you'd be wise to invest in a good anti-viral program, just in case

7 5 THE KEYBOARD CABAL

System administrators are like everybody else -- they try to make things easier for themselves And when you sit in front of a keyboard all day, that can mean trying everything possible to reduce the number of keys you actually have to hit each day

Unfortunately, that can make it difficult for the rest of us

You've already read about bin and lost+found directories Etc is another seemingly interesting directory that turns out to be another place to store files used by the ftp site itself Again, nothing of any real interest.

Then, once you get into the actual file libraries, you'll find that in many cases, files will have such non-descriptive names as V1.1-AK.TXT The best known example is probably a set of several hundred files known as RFCs, which provide the basic technical and organizational information on which much of the Internet is built. These files can be found on many ftp sites, but always in a form such as RFC101 TXT, RFC102 TXT and so on, with no clue whatsoever as to what information they contain.

Fortunately, almost all ftp sites have a "Rosetta Stone" to help you decipher these names Most will have a file named README (or some variant) that gives basic information about the system. Then, most directories will either have a similar README file or will have an index that does give brief descriptions of each file These are usually the first file in a directory and often are in the form 00INDEX.TXT. Use the ftp command to get this file. You can then scan it online or download it to see which files you might be interested in.

Another file you will frequently see is called ls-lR.Z. This contains a listing of every file on the system, but without any descriptions (the name comes from the Unix command ls -lR, which gives you a listing of all the files in all your directories). The Z at the end means the file has been compressed, which means you will have to use a Unix un-compress command before you can read the file.

And finally, we have those system administrators who almost seem to delight in making things difficult -- the ones who take full advantage of Unix's ability to create absurdly long file names. On some FTP sites, you will see file names as long as 80 characters or so, full of capital letters, underscores and every other orthographic device that will make it almost impossible for you to type the file name correctly when you try to get it Your secret weapon here is the mget command. Just type mget, a space, and the first five or six letters of the file name, followed by an asterisk, for example.

```
mget This_F*
```

The FTP site will ask you if you want to get the file that begins with that name If there are several files that start that way, you might have to answer 'n' a few times, but it's still easier than trying to recreate a ludicrously long file name.

7.6 SOME INTERESTING FTP SITES

What follows is a list of some interesting ftp sites, arranged by category With hundreds of ftp sites now on the Net, however, this list barely scratches the surface of what is available. Liberal use of archie will help you find specific files.

The times listed for each site are in Eastern time and represent the periods during which it is considered acceptable to connect.

AMIGA

ftp uu net Has Amiga programs in the systems/amiga directory. Available 24 hours.

wuarchive.wustl.edu Look in the pub/aminet directory.

Available 24 hours

ATARI

atari.archive.umich.edu Find almost all the Atari files you'll ever need, in the atari directory.
7 p.m. - 7 a.m.

BOOKS

rtfm.mit.edu The pub/usenet/rec.arts.books directories has reading lists for various authors as well as lists of recommended bookstores in different cities. Unfortunately, this site uses incredibly long file names -- so long they may scroll off the end of your screen if you are using an MS-DOS or certain other computers. Even if you want just one of the files, it probably makes more sense to use mget than get. This way, you will be asked on each file whether you want to get it; otherwise you may wind up frustrated because the system will keep telling you the file you want doesn't exist (since you may miss the end of its name due to the scrolling problem)
6 p.m. - 6 a.m

mrcnext.cso.uiuc.edu Project Gutenberg is an effort to translate paper texts into electronic form. Already available are more than 100 titles, from works by Lewis Carrol to Mark Twain; from "A Tale of Two Cities" to "Son of Tarzan." Look in the /etext/etext92 and /etext/etext93 directories
6 p.m. - 9 a.m.

COMPUTER ETHICS

ftp.eff.org The home of the Electronic Frontier Foundation. Use cd to get to the pub directory and then look in the EFF, SJG and CPSR directories for documents on the EFF itself and various issues related to the Net, ethics and the law
Available 24 hours

CONSUMER

rtfm.mit.edu The pub/usenet/misc.consumers directory has documents related to credit. The pub/usenet/rec.travel.air directory will tell you how to deal with airline reservation clerks, find the best prices on seats, etc. See under Books for a caveat in using this ftp site.
6 p.m. - 6 a.m.

COOKING

wuarchive.wustl.edu Look for recipes and recipe directories in the usenet/rec.food.cooking/recipes directory.

gatekeeper.dec.com Recipes are in the pub/recipes directory.

ECONOMICS

neeedc.umesbs.maine.edu The Federal Reserve Bank of Boston uses this site (yes, there are three 'e's in "neeedc") to house all sorts of data on the New England economy. Many files contain 20 years or more of information, usually in forms that are easily adaptable to spreadsheet or database files. Look in the frbb directory.
6 p.m - 6 a m

town.hall.org. Look in the edgar directory for the beginnings of a system to distribute annual reports and other data publicly held companies are required to file with the Securities and Exchange Commission. The other/fed directory holds various statistical files from the Federal Reserve Board.

FTP

iraun1.ira.uka de Run by the computer-science department of the University of Karlsruhe in Germany, this site offers lists of anonymous-FTP sites both internationally (in the anon.ftp.sites directory) and in Germany (in anon ftp.sites.DE).
12 p.m to 2 a.m.

ftp netcom com The pub/profiles directory has lists of ftp sites.

GOVERNMENT

ncsuvm.cc ncsu.edu The SENATE directory contains bibliographic records of U S Senate hearings and documents for the past several Congresses Get the file README DOS9111, which will explain the cryptic file names
6 p.m - 6 a m

nptn.org The General Accounting Office is the investigative wing of Congress The pub/e.texts/gao reports directory represents an experiment by the agency to use ftp to distribute its reports.
Available 24 hours.

info umd edu The info/Government/US/Whitehouse directory has copies of press releases and other documents from the Clinton administration.
6 p m - 6 a.m

leginfo public ca.gov This is a repository of legislative calendars, bills and other information related to state government in California.
Available 24 hours

whitehouse gov Look for copies of presidential position papers, transcripts of press conferences and related information here
Available 24 hours

See also under law

HISTORY

nptn org This site has a large, growing collecting of text files In the pub/e texts/freedom shrine directory, you'll find copies of important historical documents, from the Magna Carta to the Declaration of Independence and the Emancipation Proclamation
Available 24 hours.

ra.msstate.edu Mississippi State maintains an eclectic database of historical documents, detailing everything from Attilla's battle strategy to songs of soldiers in Vietnam, in the docs/history directory
6 p m - 6 a m

seq1 loc gov The Library of Congress has acquired numerous documents from the former Soviet government and has translated many of them into English In the pub/soviet archive/text english directory, you'll find everything from telegrams from Lenin ordering the death of peasants to Khrushchev's response to Kennedy during the Cuban missile crisis The README file in the pub/soviet.archive directory provides an index to the documents
6 p m - 6 a m

HONG KONG

nok.lcs.mit.edu GIF pictures of Hong Kong pop stars, buildings and vistas are available in the pub/hongkong/HKPA directory.
6 p m. - 6 a.m

INTERNET

ftp.eff org The pub/Net_info directory has a number of sub-directories containing various Internet resources guides and information files, including the latest online version of the Big Dummy's Guide
Available 24 hours

nic.ddn mil The internet-drafts directory contains information about Internet, while the scc directory holds network security bulletins
6 p.m. - 6 a m

LAW

info umd edu U.S. Supreme Court decisions from 1989 to the present are stored in the info/Government/US/SupremeCt directory. Each term has a separate directory (for example, term1992). Get the README and Index files to help decipher the case numbers.
6 p.m. - 6 a.m

ftp uu net Supreme Court decisions are in the court-opinions directory. You'll want to get the index file, which tells you which file numbers go with which file names The decisions come in WordPerfect and Atex format only.
Available 24 hours a day

LIBRARIES

ftp.unt edu The library directory contains numerous lists of libraries with computerized card catalogs accessible through the Net.

LITERATURE

nptn org In the pub/e texts/gutenberg/etext91 and etext92 directories, you can get copies of Aesop's Fables, works by Lewis Carroll and other works of literature, as well as the Book of Mormon
Available 24 hours

world std com The obi directory has everything from online fables to accounts of Hiroshima survivors
6 p m - 6 a m

MACINTOSH

sumex-aim stanford.edu This is the premier site for Macintosh software After you log in, switch to the info-mac directory, which will bring up a long series of sub-directories of virtually every free and shareware Mac program you could ever want.

9 p m. - 9 a m

ftp uu.net You'll find lots of Macintosh programs in the systems/mac/simtel20 directory.

Available 24 hours a day

MOVIE REVIEWS

lcs mit.edu Look in the movie-reviews directory

6 p m - 6 a.m

MS-DOS

wuarchive wustl edu This carries one of the world's largest collections of MS-DOS software The files are actually copied, or "mirrored" from a computer at the U S. Army's White Sands Missile Range (which uses ftp software that is totally incomprehensible). It also carries large collections of Macintosh, Windows, Atari, Amiga, Unix, OS9, CP/M and Apple II software Look in the mirrors and systems directories The gif directory contains a large number of GIF graphics images

Accessible 24 hours

ftp uu.net Look for MS-DOS programs and files in the systems/msdos/simtel20 directory.

Available 24 hours a day

MUSIC

cs uwp edu The pub/music directory has everything from lyrics of contemporary songs to recommended CDs of baroque music It's a little different - and easier to navigate - than other ftp sites File and directory names are on the left, while on the right, you'll find a brief description of the file or directory, like this

```
SITES          1528  Other music-related FTP archive sites
classical/       -  (dir) Classical Buying Guide
database/         -  (dir) Music Database program
discog/          =  (dir) Discographies
faqs/          =  (dir) Music Frequently Asked questions files
folk/          -  (dir) Folk Music Files and pointers
guitar/         =  (dir) Guitar TAB files from ftp.nevada.edu
info/          =  (dir) rec.music.info archives
interviews/        -  (dir) Interviews with musicians/groups
lists/         =  (dir) Mailing lists archives
```

```
lyrics/          = (dir) Lyrics Archives
misc/            - (dir) Misc files that don't fit anywhere else
pictures/        = (dir) GIFS, JPEGs, PBMs and more.
press/           - (dir) Press Releases and misc articles
programs/          - (dir) Misc music-related programs for various machines
releases/        = (dir) Upcoming USA release listings
sounds/          = (dir) Short sound samples
226 Transfer complete.
ftp>
```

When you switch to a directory, don't include the /.
7 p m. - 7 a.m.

potemkin.cs.pdx.edu The Bob Dylan archive Interviews, notes, year-by-year accounts of his life and more, in the pub/dylan directory.
9 p.m - 9 a m.

ftp nevada edu Guitar chords for contemporary songs are in the pub/guitar directory, in subdirectories organized by group or artist.

NATIVE AMERICANS

pines.hsu.edu Home of IndianNet, this site contains a variety of directories and files related to Indians and Eskimos, including federal census data, research reports and a tribal profiles database Look in the pub and indian directories.

PETS

rtfm.mit.edu The pub/usenet/rec pets.dogs and pub/usenet.rec.pets.cats directories have documents on the respective animals See under Books for a caveat in using this ftp site.
6 p.m - 6 a.m.

PICTURES

wuarchiv wustl.edu The graphics/gif directory contains hundreds of GIF photographic and drawing images, from cartoons to cars, space images to pop stars These are arranged in a long series of subdirectories.

PHOTOGRAPHY

ftp.nevada edu Photolog is an online digest of photography news, in the pub/photo directory

RELIGION

nptn org In the pub/e texts/religion directory, you'll find subdirectories for chapters and books of both the Bible and the Koran.

Available 24 hours

SCIENCE FICTION

elbereth rutgers edu In the pub/sfl directory, you'll find plot summaries for various science-fiction TV shows, including Star Trek (not only the original and Next Generation shows, but the cartoon version as well), Lost in Space, Battlestar Galactica, the Twilight Zone, the Prisoner and Doctor Who There are also lists of various things related to science fiction and an online science-fiction fanzine.

6 p.m - 6 a.m

SEX

rtfm mit edu Look in the pub/usenet/alt sex and pub/usenet/alt sex.wizards directories for documents related to all facets of sex See under Books for a caveat in using this ftp site

6 p m - 6 a m

SHAKESPEARE

atari archive.umich edu The shakespeare directory contains most of the Bard's works. A number of other sites have his works as well, but generally as one huge mega-file This site breaks them down into various categories (comedies, poetry, histories, etc) so that you can download individual plays or sonnets

SPACE

ames arc nasa gov Stores text files about space and the history of the NASA space program in the pub/SPACE subdirectory In the pub/GIF and pub/SPACE/GIF directories, you'll find astronomy- and NASA-related GIF files, including pictures of planets, satellites and other celestial objects

9 p m. - 9 a.m.

TV

coe montana.edu The pub/TV/Guides directory has histories and other information about dozens of TV shows. Only two anonymous-ftp log-ins are allowed at a time, so you might have to try more than once to get in.

8 p m - 8 a.m.

ftp cs.widener.edu The pub/simpsons directory has more files than anybody could possibly need about Bart and family The pub/strek directory has files about the original and Next Generation shows as well as the movies.

See also under Science Fiction.

TRAVEL

nic stolaf edu Before you take that next overseas trip, you might want to see whether the State Department has issued any kind of advisory for the countries on your itinerary. The advisories, which cover everything from hurricane damage to civil war, are in the pub/travel-advisories/advisories directory, arranged by country.

7 p.m - 7 a.m

USENET

ftp.uu.net In the usenet directory, you'll find "frequently asked questions" files, copied from rtfm mit.edu. The communications directory holds programs that let MS-DOS users connect directly with UUCP sites. In the info directory, you'll find information about ftp and ftp sites. The inet directory contains information about Internet.

Available 24 hours

rtfm.mit edu This site contains all available "frequently asked questions" files for Usenet newsgroups in the pub/usenet directory. See under Books for a caveat in using this ftp site.

6 p m - 6 a.m.

VIRUSES

ftp unt edu The antivirus directory has anti-virus programs for MS-DOS and Macintosh computers

7 p m - 7 a.m

WEATHER

wuarchive wustl.edu The /multimedia/images/wx directory contains GIF weather images of North America Files are updated hourly and take this general form: CV100222 The first two letters tell the type of file· CV means it is a visible-light photo taken by a weather satellite CI images are similar, but use infrared light Both these are in black and white. Files that begin with SA are color radar maps of the U.S. that show severe weather patterns but also fronts and temperatures in major cities The numbers indicate the date and time (in GMT - five hours ahead of EST) of the image: the first two numbers represent the month, the next two the date, the last two the hour The file WXKEY GIF explains the various symbols in SA files

7 7 ncftp -- NOW YOU TELL ME!

If you're lucky, the people who run your host system or public-access site have installed a program called ncftp, which takes some of the edges off the ftp process

For starters, when you use ncftp instead of plain old ftp, you no longer have to worry about misspelling "anonymous" when you connect The program does it for you And once you're in, instead of getting line after line filled with dashes, x's, r's and d's, you only get listings of the files or directories themselves (if you're used to MS-DOS, the display you get will be very similar to that produced by the dir/w command) The program even creates a list of the ftp sites you've used most recently, so you can pick from that list, instead of trying to remember some incredibly complex ftp site name

Launching the program, assuming your site has it, is easy At the command prompt, type

```
ncftp sitename
```

where "sitename" is the site you want to reach (alternately, you could type just ncftp and then use its open command) Once connected, you can use the same ftp commands you've become used to, such as ls, get and mget. Entries that end in a / are directories to which you can switch with cd, others are files you can get A couple of useful ncftp commands include type, which lets you change the type of file transfer (from ASCII to binary for example) and size, which lets you see how large a file is before you get it, for example

```
size declaration txt
```

would tell you how large the declaration txt file is before you get it. When you say "bye" to disconnect from a site, ncftp remembers the last directory you were in, so that the next time you connect to the site, you are put back into that directory automatically If you type

```
help
```

you'll get a list of files you can read to extend the power of the program even further.

7.8 PROJECT GUTENBERG -- ELECTRONIC BOOKS

Project Gutenberg, coordinated by Michael Hart, has a fairly ambitious goal to make more than 10,000 books and other documents available electronically by the year 2001. In 1993, the project uploaded an average of four books a month to its ftp sites; in 1994, they hope to double the pace

Begun in 1971, the project already maintains a "library" of hundreds of books and stories, from Aesop's Fables to "Through the Looking Glass" available for the taking. It also has a growing number of current-affairs documents, such as the CIA's annual "World Factbook" almanac.

Besides nptn.org, Project Gutenberg texts can be retrieved from mrcnext cso uiuc.edu in the etext directory

7.9 WHEN THINGS GO WRONG

* You get a "host unavailable" message. The ftp site is down for some reason.

Try again later.

* You get a "host unknown" message

Check your spelling of the site name.

* You misspell "anonymous" when logging in and get a message telling you a password is required for whatever you typed in.

Type something in, hit enter, type bye, hit enter, and try again Alternately, try typing "ftp" instead of "anonymous." It will work on a surprising number of sites Or just use ncftp, if your site has it, and never worry about this again.

7 10 FYI

Liberal use of archie will help you find specific files or documents For information on new or interesting ftp sites, try the comp archives newsgroup on Usenet. You can also look in the comp.misc, comp sources.wanted or news.answers newsgroups on Usenet for lists of ftp sites posted every month by Tom Czarnik and Jon Granrose

The comp archives newsgroup carries news of new ftp sites and interesting new files on existing sites.

In the comp.virus newsgroup on Usenet, look for postings that list ftp sites carrying anti-viral software for Amiga, MS-DOS, Macintosh, Atari and other computers

The comp sys ibm pc digest and comp sys mac digest newsgroups provide information about new MS-DOS and Macintosh programs as well as answers to questions from users of those computers

Chapter 8: GOPHERS, WAISs AND THE WORLD-WIDE WEB

8.1. GOPHERS

Even with tools like Hytelnet and archie, telnet and ftp can still be frustrating. There are all those telnet and ftp addresses to remember. Telnet services often have their own unique commands. And, oh, those weird directory and file names!

But now that the Net has become a rich repository of information, people are developing ways to make it far easier to find and retrieve information and files. Gophers and Wide-Area Information Servers (WAISs) are two services that could ultimately make the Internet as easy to navigate as commercial networks such as CompuServe or Prodigy.

Both gophers and WAISs essentially take a request for information and then scan the Net for it, so you don't have to. Both also work through menus -- instead of typing in some long sequence of characters, you just move a cursor to your choice and hit enter. Gophers even let you select files and programs from ftp sites this way

Let's first look at gophers (named for the official mascot of the University of Minnesota, where the system was developed).

Many public-access sites now have gophers online. To use one, type

```
     gopher
```

at the command prompt and hit enter If you know your site does not have a gopher, or if nothing happens when you type that, telnet to

```
     consultant.micro.umn.edu
```

At the log-in prompt, type

```
     gopher
```

and hit enter. You'll be asked what type of terminal emulation you're using, after which you'll see something like this:

```
             Internet Gopher Information Client v1.03

             Root gopher server: gopher.micro.umn.edu

--> 1. Information About Gopher/
```

```
    2  Computer Information/
    3  Discussion Groups/
    4  Fun & Games/
    5. Internet file server (ftp) sites/
    6  Libraries/
    7. News/
    8  Other Gopher and Information Servers/
    9  Phone Books/
    10  Search lots of places at the U of M  <?>
    11  University of Minnesota Campus Information/

Press ? for Help, q to Quit, u to go up a menu          Page  1/1
```

Assuming you're using VT100 or some other VT emulation, you'll be able to move among the choices with your up and down arrow keys When you have your cursor on an entry that looks interesting, just hit enter, and you'll either get a new menu of choices, a database entry form, or a text file, depending on what the menu entry is linked to (more on how to tell which you'll get in a moment).

Gophers are great for exploring the resources of the Net Just keep making choices to see what pops up. Play with it, see where it takes you Some choices will be documents When you read one of these and either come to the end or hit a lower-case q to quit reading it, you'll be given the choice of saving a copy to your home directory or e-mailing it to yourself Other choices are simple databases that let you enter a word to look for in a particular database To get back to where you started on a gopher, hit your u key at a menu prompt, which will move you back "up" through the gopher menu structure (much like "cd . " in ftp)

Notice that one of your choices above is "Internet file server (ftp) sites." Choose this, and you'll be connected to a modified archie program -- an archie with a difference When you search for a file through a gopher archie, you'll get a menu of sites that have the file you're looking for, just as with the old archie Only now, instead of having to write down or remember an ftp address and directory, all you have to do is position the cursor next to one of the numbers in the menu and hit enter. You'll be connected to the ftp site, from which you can then choose the file you want This time, move the cursor to the file you want and hit a lower-case s You'll be asked for a name in your home directory to use for the file, after which the file will be copied to your home system Unfortunately, this file-transfer process does not yet work with all public-access sites for computer programs and compressed files If it doesn't work with yours, you'll have to get the file the old-fashioned way, via anonymous ftp

In addition to ftp sites, there are hundreds of databases and libraries around the world accessible through gophers There is not yet a common gopher interface for library catalogs, so be prepared to follow the online directions more closely when you use gopher to connect to one.

Gopher menu entries that end in a / are gateways to another menu of options. Entries that end in a period are text, graphics or program files, which you can retrieve to your home directory (or e-mail to yourself or to somebody else). A line that ends in <?> or <CSO> represents a request you can make to a database for information. The difference is that <?> entries call up one-line interfaces in which you can search for a keyword or words, while <CSO> brings up an electronic form with several fields for you to fill out (you might see this in online "White Pages" directories at colleges).

Gophers actually let you perform some relatively sophisticated Boolean searches. For example, if you want to search only for files that contain the words "MS-DOS" and "Macintosh," you'd type

```
ms-dos and macintosh
```

(gophers are not case-sensitive) in the keyword field. Alternately, if you want to get a list of files that mention either "MS-DOS" or "Macintosh," you'd type

```
ms-dos or macintosh
```

8.2 BURROWING DEEPER

As fascinating as it can be to explore "gopherspace," you might one day want to quickly retrieve some information or a file. Or you might grow tired of calling up endless menus to get to the one you want. Fortunately, there are ways to make even gophers easier to use

One is with archie's friend, veronica (it allegedly is an acronym, but don't believe that for a second), who does for gopherspace what archie does for ftp sites

In most gophers, you'll find veronica by selecting "Other gopher and information services" at the main menu and then "Searching through gopherspace using veronica." Select this and you'll get something like this:

```
             Internet Gopher Information Client v1.1

            Search titles in Gopherspace using veronica


-->  1.                                       .
```

```
2. FAQ: Frequently-Asked Questions about veronica (1993/08/23)
3. How to compose veronica queries (NEW June 24) READ ME!!.
4 Search Gopher Directory Titles at PSINet <?>
5. Search Gopher Directory Titles at SUNET <?>
6 Search Gopher Directory Titles at U. of Manitoba <?>
7. Search Gopher Directory Titles at University of Cologne <?>
8. Search gopherspace at PSINet <?>
9. Search gopherspace at SUNET <?>
10 Search gopherspace at U. of Manitoba <?>
11 Search gopherspace at University of Cologne <?>


Press ? for Help, q to Quit, u to go up a menu            Page. 1/1
```

A few choices there! First, the difference between searching directory titles and just plain ol' gopherspace. If you already know the sort of directory you're looking for (say a directory containing MS-DOS programs), do a directory-title search But if you're not sure what kind of directory your information might be in, then do a general gopherspace search In general, it doesn't matter which of the particular veronicas you use -- they should all be able to produce the same results The reason there is more than one is because the Internet has become so popular that only one veronica (or one gopher or one of almost anything) would quickly be overwhelmed by all the information requests from around the world

You can use veronica to search for almost anything Want to find museums that might have online displays from their exhibits? Try searching for "museum." Looking for a copy of the Declaration of Independence? Try "declaration "

In many cases, your search will bring up a new gopher menu of choices to try.

Say you want to impress those guests coming over for dinner on Friday by cooking cherries flambe. If you were to call up veronica and type in "flambe" after calling up veronica, you would soon get a menu listing several flambe recipes, including one called "dessert flambe " Put your cursor on that line of the menu and hit enter, and you'll find it's a menu for cherries flambe. Then hit your q key to quit, and gopher will ask you if you want to save the file in your home directory on your public-access site or whether you want to e-mail it somewhere.

As you can see, you can use veronica as an alternative to archie, which, because of the Internet's growing popularity, seems to take longer and longer to work

In addition to archie and veronica, we now also have jugheads (no bettys yet, though). These work the same as veronicas, but their searches are limited to the specific gopher systems on which they reside.

If there are particular gopher resources you use frequently, there are a couple of ways to get to them even more directly.

One is to use gopher in a manner similar to the way you can use telnet. If you know a particular gopher's Internet address (often the same as its telnet or ftp address), you can connect to it directly, rather than going through menus. For example, say you want to use the gopher at info umd.edu If your public-access site has a gopher system installed, type this

```
gopher info umd edu
```

at your command prompt and you'll be connected.

But even that can get tedious if there are several gophers you use frequently That's where bookmarks come in Gophers let you create a list of your favorite gopher sites and even database queries Then, instead of digging ever deeper into the gopher directory structure, you just call up your bookmark list and select the service you want.

To create a bookmark for a particular gopher site, first call up gopher. Then go through all the gopher menus until you get to the menu you want. Type a capital A. You'll be given a suggested name for the bookmark enty, which you can change if you want by backspacing over the suggestion and typing in your own. When done, hit enter. Now, whenever you're in gopherspace and want to zip back to that particular gopher service, just hit your V key (upper- or lower-case; in this instance, gopher doesn't care) anywhere within gopher. This will bring up a list of your bookmarks Move to the one you want and hit enter, and you'll be connected

Using a capital A is also good for saving particular database or veronica queries that you use frequently (for example, searching for news stories on a particular topic if your public-access site maintains an indexed archive of wire-service news).

Instead of a capital A, you can also hit a lower-case a. This will bring you to the particular line within a menu, rather than show you the entire menu

If you ever want to delete a bookmark, hit V within gopher, select the item you want to get rid of, and then hit your D key

One more hint:

If you want to find the address of a particular gopher service, hit your = key after you've highlighted its entry in a gopher menu. You'll get back a couple of lines, most of which will be technicalese of no immediate value to most folks, but some of which will consist of the site's address

8.3. GOPHER COMMANDS

a	Add a line in a gopher menu to your bookmark list.
A	Add an entire gopher menu or a database query to your bookmark list.
d	Delete an entry from your bookmark list (you have to hit v first).
q	Quit, or exit, a gopher. You'll be asked if you really want to.
Q	Quit, or exit, a gopher without being asked if you're sure.
s	Save a highlighted file to your home directory.
u	Move back up a gopher menu structure
v	View your bookmark list
=	Get information on the originating site of a gopher entry.
>	Move ahead one screen in a gopher menu.
<	Move back one screen in a gopher menu.

8.4. SOME INTERESTING GOPHERS

There are now hundreds of gopher sites around the world. What follows is a list of some of them. Assuming your site has a gopher "client" installed, you can reach them by typing

```
gopher sitename
```

at your command prompt Can't find what you're looking for? Remember to use veronica to look up categories and topics!

AGRICULTURE

cyfer esusda gov	More agricultural statistics and regulations most people will ever need.
usda mannlib cornell.edu	More than 140 different types of agricultural data, most in Lotus 1-2-3 spreadsheet format.

ANIMALS

saimiri.primate.wisc.edu	Information on primates and animal-welfare laws.

ARCHITECTURE

libra.arch.umich.edu	Maintains online exhibits of a variety of architectural images.

ART

marvel.loc.gov	The Library of Congress runs several online "galleries" of images from exhibits at the library. Many of these pictures, in GIF or JPEG format, are HUGE, so be careful what you get first. Exhibits include works of art from the Vatican, copies of once secret Soviet documents and pictures of artifacts related to Columbus's 1492 voyage. At the main menu, select 2 and then "Exhibits."
galaxy.ucr.edu	The California Museum of Photography maintains its own online galery here. At the main menu, select "Campus Events," then "California Museum of Photography," then "Network Exhibitions."

ASTRONOMY

cast0.ast.cam.ac.uk	A gopher devoted to astronomy, run by the Institute of Astronomy and the Royal Greenwich Observatory, Cambridge, England.

CENSUS

bigcat.missouri.edu	You'll find detailed federal census data for communities of more than 10,000 people, as well as for states and counties here. At the main menu, select "Reference and Information Center," then "United States and Missouri Census Information" and "United States Census."

COMPUTERS

wuarchive.wustl edu	Dozens of directories with software for all sorts of computers. Most programs have to be "un-compressed" before you can use them
sumex-aim.stanford.edu	A similar type of system, with the emphasis on Macintosh programs and files

DISABILITY

val-dor cc buffalo edu	The Cornucopia of Disability Information carries numerous information resources on disability issues and links to other disability-related services

ENVIRONMENT

ecosys drdr virginia edu	Copies of Environmental Protection Agency factsheets on hundreds of chemicals, searchable by keyword Select "Education" and then "Environmental fact sheets "
envirolink org	Dozens of documents and files related to environmental activism around the world

ENTOMOLOGY

spider.ento csiro.au	All about creepy-crawly things, both the good and the bad ones

GEOLOGY

gopher stolaf edu	Select "Internet Resources" and then "Weather and geography" for information on recent earthquakes

GOVERNMENT

marvel loc gov	Run by the Library of Congress, this site provides numerous resources, including access to the Library card catalog and all manner of information about the U.S. Congress
gopher lib umich edu	Wide variety of government information, from Congressional committee assignments to economic statistics and NAFTA information.

ecix.doc.gov	Information on conversion of military installations to private uses
sunsite unc edu	Copies of current and past federal budgets can be found by selecting "Sunsite archives," then "Politics," then "Sunsite politcal science archives "
wiretap.spies.com	Documents related to Canadian government can be found in the "Government docs" menu.
stis.nih gov	Select the "Other U S government gopher servers" for access to numerous other federal gophers

HEALTH

odie niaid.nih gov	National Institutes of Health databases on AIDS, in the "AIDS related information" menu.
helix nih.gov	For National Cancer Institute factsheets on different cancers, select "Health and clinical information" and then "Cancernet information."
nysernet org	Look for information on breast cancer in the "Special Collections: Breast Cancer" menu.
welchlink.welch.jhu edu	This is Johns Hopkins University's medical gopher.

HISTORY

See under Art.

INTERNET

gopher lib umich edu	Home to several guides to Internet resources in specific fields, for example, social sciences Select "What's New & Featured Resources" and then "Clearinghouse "

ISRAEL

jerusalem1 datasrv.co il	This Israeli system offers numerous documents on Israel and Jewish life.

JAPAN

gopher.ncc go jp	Look in the "Japan information" menu for documents related to Japanese life and culture

MUSIC

mtv.com	Run by Adam Curry, an MTV video jock, this site has music news and Curry's daily "Cybersleaze" celebrity report

NATURE

ucmp1 berkeley edu	The University of California at Berkeley's Museum of Paleontology runs several online exhibits here You can obtain GIF images of plants and animals from the "Remote Nature" menu The "Origin of the Species" menu lets you read Darwin's work or search it by keyword.

SPORTS

culine colorado edu	Look up schedules for teams in various professional sports leagues here, under "Professional Sports Schedules."

WEATHER

wx.atmos uiuc edu	Look up weather forecasts for North America or bone up on your weather facts

8 5 WIDE-AREA INFORMATION SERVERS

Now you know there are hundreds of databases and library catalogs you can search through But as you look, you begin to realize that each seems to have its own unique method for searching If you connect to several, this can become a pain Gophers reduce this problem somewhat

Wide-area information servers promise another way to zero in on information hidden on the Net. In a WAIS, the user sees only one interface -- the program worries about how to access information on dozens, even hundreds, of different databases You tell give a WAIS a word and it scours the net looking for places where it's mentioned You get a menu of documents, each ranked according to how relevant to your search the WAIS thinks it is.

Like gophers, WAIS "client" programs can already be found on many public-access Internet sites If your system has a WAIS client, type

```
swais
```

at the command prompt and hit enter (the "s" stands for "simple"). If it doesn't, telnet to bbs oit.unc edu, which is run by the University of North Carolina At the "login." prompt, type

```
bbs
```

and hit enter   You'll be asked to register and will then get a list of "bulletins," which are various files explaining how the system works When done with those, hit your Q key and you'll get another menu. Hit 4 for the "simple WAIS client," and you'll see something like this:

```
SWAIS                    Source Selection            Sources: 23#
          Server                    Source              Cost
001    [          archie au]  aarnet-resource-guide          Free
002·   [   archive orst edu]  aeronautics                    Free
003.   [nostromo.oes orst.ed]  agricultural-market-news      Free
004·   [sun-wais oit.unc.edu]  alt-sys-sun                   Free
005    [   archive.orst edu]  alt drugs                      Free
006    [   wais oit.unc.edu]  alt gopher                     Free
007    [sun-wais oit unc.edu]  alt sys sun                   Free
008    [   wais oit unc edu]  alt.wais                       Free
009·   [   archive orst edu]  archie-orst.edu                Free
010    [          archie au]  archie au-amiga-readmes        Free
011·   [          archie au]  archie au-ls-lRt               Free
012·   [          archie au]  archie.au-mac-readmes          Free
013·   [          archie au]  archie.au-pc-readmes           Free
014·   [ pc2 pc maricopa.edu]  ascd-education                Free
015    [          archie au]  au-directory-of-servers        Free
016    [  cirm2 univ-mrs.fr]  bib-cirm                       Free
017    [ cmns-sun.think.com]  bible                          Free
018    [     zenon.inria.fr]  bibs-zenon-inria-fr            Free

Keywords:

<space> selects, w for keywords, arrows move, <return> searches, q quits, or ?
```

Each line represents a different database (the au at the end of some of them means they are in Australia; the .fr on the last line represents a database in France). And this is just the first page! If you type a capital K, you'll go to the next page (there are several pages). Hitting a capital J will move you back a page.

The first thing you want to do is tell the WAIS program which databases you want searched To select a database, move the cursor bar over the line you want (using your down and up arrow keys) and hit your space bar. An asterisk will appear next to the line number Repeat this until you've selected all of the databases you want searched Then hit your W key, after which you'll be prompted for the key words you're looking for You can type in an entire line of these words -- separate each with a space, not a comma.

Hit return, and the search begins.

Let's say you're utterly fascinated with wheat So you might select agricultural-market-news to find its current world price. But you also want to see if it has any religious implications, so you choose the Bible and the Book of Mormon. What do you do with the stuff? Select recipes and usenet-cookbook Are there any recent Supreme Court decisions involving the plant? Choose supreme-court How about synonyms? Try roget-thesaurus and just plain thesaurus

Now hit w and type in wheat Hit enter, and the WAIS program begins its search As it looks, it tells you whether any of the databases are offline, and if so, when they might be ready for a search In about a minute, the program tells you how many hits it's found. Then you get a new menu, that looks something like this.

```
Keywords.

 #   Score   SourceTitleLines
001  [1000] (roget-thesaurus)     #465  [results of comparison. 1] Di    19
002  [1000] (roget-thesaurus)     #609  Choice  -- N. choice, option,    36
003  [1000] (roget-thesaurus)     #465  [results of comparison  1] Di    19
004  [1000] (roget-thesaurus)     #609  Choice  -- N  choice, option,    36
005  [1000] (recipes)  aem@mthvax Re  MONTHLY  Rec Food Recipes   425
006  [1000] ( Book_of_Mormon)  Mosiah 9.96
007  [1000] ( Book_of_Mormon)  3 Nephi 18 185
008  [1000] (agricultural-ma)  Re    JO GR115, WEEKLY GRAIN82
009  [ 822] (agricultural-ma)  Re   WA CB351 PROSPECTIVE PLANTINGS      552
010  [ 800] (      recipes) kms@apss.a Re  REQUEST. Wheat-free, Suga   35
011.  [ 750] (agricultural-ma)  Re   WA CB101 CROP PRODUCTION258
012  [ 643] (agricultural-ma)  Re   SJ GR850 DAILY NAT GRN SUM72
013  [ 400] (      recipes)  pat@jaamer Re  VEGAN  Honey Granola63
014  [ 400] (      recipes)  jrtrint@pa Re  OVO-LACTO  Sourdough/Trit  142
```

Each of these represents an article or citing that contains the word wheat, or some related word Move the cursor bar (with the down and up arrow keys) to the one you want to see, hit enter, and it will begin to appear on your screen. The "score" is a WAIS attempt to gauge how closely the citing matches your request. Doesn't look like the Supreme Court has had anything to say about the plant of late!

Now think of how much time you would have spent logging onto various databases just to find these relatively trivial examples

8 6 THE WORLD-WIDE WEB

Developed by researchers at the European Particle Physics Laboratory in Geneva, the World-Wide Web is somewhat similar to a WAIS But it's designed on a system known as hypertext. Words in one document are "linked" to other documents It's sort of like sitting with an encyclopedia -- you're reading an article, see a reference that intrigues you and so flip the pages to look up that reference.

To try the Worldwide Web, telnet to

```
     ukanaix.cc.ukans.edu
```

Log on as www When you connect, you'll see something like:

```
                                        Welcome to CERN
The World-Wide Web  CERN entry point

  CERN is the European Particle Physics Laboratory in Geneva, Switzerland
  Select by number information here, or elsewhere

 Help[1]             About this program

 World-Wide Web[2]     About the W3 global information initiative.

 CERN information[3]    Information from and about this site

 Particle Physics[4]    Other HEP sites with information servers

 Other Subjects[5]     Catalogue of all online information by subject. Also.
                    by server type[6] .

  ** CHECK OUT X11 BROWSER "ViolaWWW". ANON FTP TO info.cern.ch in
  /pub/www/src *** Still beta, so keep bug reports calm :-)

  If you use this service frequently, please install this or any W3 browser on
```

your own machine (see instructions[7]). You can configure it to start
1-7, <RETURN> for more, Quit, or Help:

You navigate the web by typing the number next to a given reference So if you want to know more about the web, hit 2. This is another system that bears playing with

8.7. CLIENTS, OR HOW TO SNARE MORE ON THE WEB

If you are used to plain-vanilla Unix or MS-DOS, then the way these gophers and WAISs work seems quite straightforward But if you're used to a computer with a graphical interface, such as a Macintosh, an IBM compatible with Windows or a Next, you'll probably regard their interfaces as somewhat primitive. And even to a veteran MS-DOS user, the World-Wide Web interface is rather clunky (and some of the documents and files on the Web now use special formatting that would confuse your poor computer).

There are, however, ways to integrate these services into your graphical user interface In fact, there are now ways to tie into the Internet directly, rather than relying on whatever interface your public-access system uses, through what are known as "client" programs These programs provide graphical interfaces for everything from ftp to the World-Wide Web

There is now a growing number of these "client" programs for everything from ftp to gopher. PSI of Reston, Va , which offers nationwide Internet access, in fact, requires its customers to use these programs Using protocols known as SLIP and PPP, these programs communicate with the Net using the same basic data packets as much larger computers online

Beyond integration with your own computer's "desktop," client programs let you do more than one thing at once on the net -- while you're downloading a large file in one window, you can be chatting with a friend through an Internet chat program in another

Unfortunately, using a client program can cost a lot of money Some require you to be connected directly to the Internet through an Ethernet network for example Others work through modem protocols, such as SLIP, but public-access sites that allow such access may charge anywhere from $25 to $200 a month extra for the service

Your system administrator can give you more information on setting up one of these connections

8 8 WHEN THINGS GO WRONG

As the Internet grows ever more popular, its resources come under more of a strain. If you try to use gopher in the middle of the day, at least on the East Coast of the U S , you'll sometimes notice that it takes a very long time for particular menus or database searches to come up Sometimes, you'll even get a message that there are too many people connected to whichever service you're trying to use and so you can't get in The only alternative is to either try again in 20 minutes or so, or wait until later in the day, when the load might be lower. When this happens in veronica, try one of the other veronica entries.

When you retrieve a file through gopher, you'll sometimes be asked if you want to store it under some ludicrously long name (there go our friends the system administrators again, using 128 characters just because Unix lets them). With certain MS-DOS communications programs, if that name is longer than one line, you won't be able to backspace all the way back to the first line if you want to give it a simpler name Backspace as far as you can Then, when you get ready to download it to your home computer, remember that the file name will be truncated on your end, because of MS-DOS's file-naming limitations. Worse, your computer might even reject the whole thing What to do? Instead of saving it to your home directory, mail it to yourself It should show up in your mail by the time you exit gopher. Then, use your mail command for saving it to your home directory -- at which point you can name it anything you want. Now you can download it

8 9 FYI

David Riggins maintains a list of gophers by type and category. You can find the most recent one at the ftp site ftp einet.net, in the pub directory. Look for a file with a name like "gopher-jewels.txt " Alternately, you can get on a mailing list to get the latest version sent to your e-mailbox automatically Send a mail message to gopherjewelslist-request@tpis.cactus org (yep, that first part is all one word) Leave the "subject." line blank, and as a message, write SUBSCRIBE

Blake Gumprecht maintains a list of gopher and telnet sites related to, or run by, the government He posts it every three weeks to the news answers and soc.answers newsgroups on Usenet It can also be obtained via anonymous ftp from rtfm.mit.edu, as /pub/usenet/news.answers/us-govt-net-pointers.

Students at the University of Michigan's School of Information and Library Studies, recently compiled separate lists of Internet resources in 11 specific areas, from aeronautics to theater. They can be obtained via gopher at gopher.lib.umich edu, in the "What's New and Featured Resources" menu

The Usenet newsgroups comp infosystems gopher and comp.infosystems.wais are places to go for technical discussions about gophers and WAISs respectively

The Interpedia project is an attempt to take gopher one step further, by creating an online repository of all of the interesting and useful information availble on the Net and from its users. To get on the mailing list for the project, send an e-mail message, with a "subject:" of "subscribe" to interpedia-request@telerama lm.com You can get supporting documentation for the project via anonymous ftp at ftp.lm.com in the pub/interpedia directory

Chapter 10: NEWS OF THE WORLD

10.1 Clarinet: UPI, Dave Barry and Dilbert

Usenet "newsgroups" can be something of a misnomer. They may be interesting, informative and educational, but they are often not news, at least, not the way most people would think of them. But there are several sources of news and sports on the Net.

One of the largest is Clarinet, a company in Cupertino, Calif., that distributes wire-service news and columns, along with a news service devoted to computers and even the Dilbert comic strip, in Usenet form.

Distributed in Usenet form, Clarinet stories and columns are organized into more than 100 newsgroups (in this case, a truly appropriate name), some of them with an extremely narrow focus, for example, clari.news.gov.taxes. The general news and sports come from United Press International; the computer news from the NewsBytes service, the features from several syndicates.

Because Clarinet charges for its service, not all host systems carry its articles. Those that do carry them as Usenet groups starting with "clari." As with other Usenet hierarchies, these are named starting with broad area and ending with more specific categories. Some of these include business news (clari.biz); general national and foreign news, politics and the like (clari.news), sports (clari.sports), columns by Mike Royko, Miss Manners, Dave Barry and others (clari.feature), and NewsBytes computer and telecommunications reports (clari.nb). Because Clarinet started in Canada, there is a separate set of clari.canada newsgroups. The clari.nb newsgroups are divided into specific computer types (clari.nb.apple, for example).

Clari news groups feature stories updated around the clock. There are even a couple of "bulletin" newsgroups for breaking stories: clari.news.bulletin and clari.news.urgent. Clarinet also sets up new newsgroups for breaking stories that become ongoing ones (such as major natural disasters, coups in large countries and the like).

Occasionally, you will see stories in clari newsgroups that just don't seem to belong there. Stories about former Washington, D.C. mayor Marion Barry, for example, often wind interspersed among columns by Dave Barry.

This happens because of the way wire services work. UPI uses three-letter codes to route its stories to the newspapers and radio stations that make up most of its clientele, and harried editors on deadline sometimes punch in the wrong code.

10.2 REUTERS

This is roughly the British equivalent of UPI or Associated Press. Msen, a public-access site in Michigan, currently feeds Reuters dispatches into a series of Usenet-style conferences If your site subscribes to this service, look for newsgroups with names that begin in msen reuters

10.3 USA TODAY

If your host system doesn't carry the clari or msen reuters newsgroups, you might be able to keep up with the news a different way over the Net. USA Today has been something of an online newspaper pioneer, selling its stories to bulletin-board and online systems across the country for several years. Cleveland Free-Net provides the online version of USA Today (along with all its other services) for free. Currently, the paper only publishes five days a week, so you'll have to get your weekend news fix elsewhere.

Telnet freenet-in-a.cwru.edu or
freenet-in-b cwru.edu

After you connect and log in, look for this menu entry: NPTN/USA TODAY HEADLINE NEWS. Type the number next to it and hit enter You'll then get a menu listing a series of broad categories, such as sports and telecommunications Choose one, and you'll get a yet another menu, listing the ten most recent dates of publication Each of these contains one-paragraph summaries of the day's news in that particular subject

10 4 THE WORLD TODAY, FROM BELARUS TO BRAZIL

Radio Free Europe and Radio Liberty are American radio stations that broadcast to the former Communist countries of eastern Europe Every day, their news departments prepare a summary of news in those countries, which is then disseminated via the Net, through a Bitnet mailing list and a Usenet newsgroup

To have the daily digests sent directly to your e-mailbox, send a message to

```
listserv@ubvm cc buffalo edu
```

Leave the subject line blank, and as a message, write:

```
subscribe rferl-l Your Name
```

Alternately, look for the bulletins in the Usenet newsgroup misc.news-east-europe rferl

Daily Brazilian news updates are available (in Portuguese) from the University of Sao Paulo Use anonymous ftp to connect to

```
uspif.if.usp br
```

Use cd to switch to the whois directory. The news summaries are stored in files with this form NEWS 23OCT92;1 But to get them, leave off the semicolon and the 1, and don't capitalize anything, for example

```
get news 23oct92
```

Daily summaries of news reports from France (in French) are availble on the National Capital FreeNet in Ottawa, Ont. Telnet to

```
freenet.carleton.ca
```

and log on as: guest At the main menu, select the number for "The Newsstand" and then "La presse de France "

10 5 E-MAILING NEWS ORGANIZATIONS

A number of newspapers, television stations and networks and other news organizations now encourage readers and viewers to communicate with them electronically, via Internet e-mail addresses. They include:

The Middlesex News, Framingham, Mass.	sysop@news.ci net
The Boston Globe	voxbox@globe.com
WCVB-TV, Boston, Mass.	wcvb@aol.com
NBC News, New York, N.Y.	nightly@nbc.com
The Ottawa Citizen, Ottawa, Ont.	ottawa-citizen@freenet.carleton ca
CJOH-TV, Ottawa, Ont.	ab363@freenet.carleton.ca
St. Petersburg (Fla.) Times	73174 3344@compuserve com
Illinois Issues, Springfield, Ill.	gherardi@sangamon edu
WTVF-TV, Nashville, Tenn.	craig ownsby@nashville.com

10.6 FYI

The clari.net.newusers newsgroup on Usenet provides a number of articles about Clarinet and ways of finding news stories of interest to you.

To discuss the future of newspapers and newsrooms in the new electronic medium, subscribe to the Computer Assisted Reporting and Research mailing list on Bitnet. Send a mail message of

```
Subscribe carr-l Your Name
```

to listserv@ulkyvm.bitnet

Chapter 11 IRC, MUDs AND OTHER THINGS THAT ARE MORE FUN THAN THEY SOUND

Many Net systems provide access to a series of interactive services that let you hold live "chats" or play online games with people around the world. To find out if your host system offers these, you can ask your system administrator or just try them -- if nothing happens, then your system does not provide them In general, if you can use telnet and ftp, chances are good you can use these services as well.

11.1 TALK

This is the Net equivalent of a telephone conversation and requires that both you and the person you want to talk to have access to this function and are online at the same time To use it, type

```
talk user@site name
```

where user@site name is the e-mail address of the other person. She will see something like this on her screen.

```
talk  connection requested by yourname@site name
talk. respond with.  talk yourname@site.name
```

To start the conversation, she should then type (at her host system's command line)

```
talk yourname@site name
```

where that is your e-mail address Both of you will then get a top and bottom window on your screen. She will see everything you type in one window, you'll see everything she types in the other. To disconnect, hit control-C.

One note· Public-access sites that use Sun computers sometimes have trouble with the talk program. If talk does not work, try typing

```
otalk
```

or

```
ntalk
```

instead However, the party at the other end will have to have the same program online for the connection to work

11.2 INTERNET RELAY CHAT

IRC is a program that lets you hold live keyboard conversations with people around the world. It's a lot like an international CB radio - it even uses "channels " Type something on your computer and it's instantly echoed around the world to whoever happens to be on the same channel with you You can join in existing public group chats or set up your own. You can even create a private channel for yourself and as few as one or two other people. And just like on a CB radio, you can give yourself a unique "handle" or nickname.

IRC currently links host systems in 20 different countries, from Australia to Hong Kong to Israel Unfortunately, it's like telnet -- either your site has it or it doesn't. If your host system does have it, Just type

```
irc
```

and hit enter You'll get something like this

```
*** Connecting to port 6667 of server world.std com
*** Welcome to the Internet Relay Network, adamg
*** Your host is world std com, running version 2 7 1e+4
*** You have new mail
*** If you have not already done so, please read the new user information with
+/HELP NEWUSER
*** This server was created Sat Apr 18 1992 at 16 27 02 EDT
*** There are 364 users on 140 servers
*** 45 users have connection to the twilight zone
*** There are 124 channels
*** I have 1 clients and 3 servers
MOTD - world.std com Message of the Day -
MOTD - Be careful out there
MOTD -
MOTD - ->Spike
* End of /MOTD command
```

```
23 13 [1] adamg [Mail. 32] * type /help for help

-------------------------------------------------------------------
```

You are now in channel 0, the "null" channel, in which you can look up various help files, but not much else As you can see, IRC takes over your entire screen The top of the screen is where messages will appear The last line is where you type IRC commands and messages All IRC commands begin with a / The slash tells the computer you are about to enter a command, rather than a message. To see what channels are available, type

```
/list
```

and hit enter You'll get something like this.

```
*** Channel   Users  Topic
*** #Money     1    School CA$H (/msg SOS_AID help)
*** #Gone      1    ----->> Gone with the wind!!! ------>>>>>
*** #mee       1
*** #eclipse   1
*** #hiya      2
*** #saigon    4
*** #screwed   3
*** #z         2
*** #comix     1    LET'S TALK 'BOUT COMIX!!!!!
*** #Drama     1
*** #RayTrace  1     Rendering to Reality and Back
*** #NeXT      1
*** #wicca     4    Mr  Potato Head, R. I. P.
*** #dde^mhe`  1     no'ng chay? mo*? . .ba` con o*iiii
*** #jgm       1
*** #ucd       1
*** #Maine     2
*** #Snuffland 1
*** #p/g!      4
*** #DragonSrv 1
```

Because IRC allows for a large number of channels, the list might scroll off your screen, so you might want to turn on your computer's screen capture to capture the entire list Note that the channels always have names, instead of numbers. Each line in the listing tells you the channel name, the number of people currently in it, and whether there's a specific topic for it To switch to a particular channel, type

```
/join #channel
```

where "#channel" is the channel name and hit enter. Some "public" channels actually require an invitation from somebody already on it To request an invitation, type

```
/who #channel-name
```

where channel-name is the name of the channel, and hit enter Then ask someone with an @ next to their name if you can join in Note that whenever you enter a channel, you have to include the # Choose one with a number of users, so you can see IRC in action

If it's a busy channel, as soon as you join it, the top of your screen will quickly be filled with messages Each will start with a person's IRC nickname, followed by his message

It may seem awfully confusing at first There could be two or three conversations going on at the same time and sometimes the messages will come in so fast you'll wonder how you can read them all.

Eventually, though, you'll get into the rhythm of the channel and things will begin to make more sense You might even want to add your two cents (in fact, don't be surprised if a message to you shows up on your screen right away, on some channels, newcomers are welcomed immediately) To enter a public message, simply type it on that bottom line (the computer knows it's a message because you haven't started the line with a slash) and hit enter.

Public messages have a user's nickname in brackets, like this

```
<tomg>
```

If you receive a private message from somebody, his name will be between asterisks, like this·

```
*tomg*
```

11.3 IRC COMMANDS

Note: Hit enter after each command.

/away When you're called away to put out a grease fire in the kitchen, issue this command to let others know you're still connected but just away from your terminal or computer for awhile.

/help Brings up a list of commands for which there is a help file You will get a "topic:" prompt Type in the subject for which you want information and hit enter. Hit enter by itself to exit help

/invite Asks another IRC to join you in a conversation.

```
/invite fleepo #hottub
```

would send a message to fleepo asking him to join you on the #hottub channel. The channel name is optional.

/join Use this to switch to or create a particular channel, like this:

```
/join #hottub
```

If one of these channels exists and is not a private one, you will enter it Otherwise, you have just created it Note you have to use a # as the first character

/list This will give you a list of all available public channels, their topics (if any) and the number of users currently on them. Hidden and private channels are not shown.

/m name Send a private message to that user.

/mode This lets you determine who can join a channel you've created.

```
/mode #channel +s
```

creates a secret channel.

```
/mode #channel +p
```

makes the channel private

/nick This lets you change the name by which others see you

```
/nick fleepo
```

would change your name for the present session to fleepo People can still use /whois to find your e-mail address If you try to enter a channel where somebody else is already using that nickname, IRC will ask you to select another name

/query This sets up a private conversation between you and another IRC user To do this, type

```
/query nickname
```

Every message you type after that will go only to that person If she then types

```
/query nickname
```

where nickname is yours, then you have established a private conversation To exit this mode, type

```
/query
```

by itself While in query mode, you and the other person can continue to "listen" to the discussion on whatever public channels you were on, although neither of you will be able to respond to any of the messages there.

/quit Exit IRC

/signoff Exit IRC

/summon Asks somebody connected to a host system with IRC to join you on IRC You must use the person's entire e-mail address

```
/summon fleepo@foo.bar com
```

would send a message to fleepo asking him to start IRC Usually not a good idea to just summon people unless you know they're already amenable to the idea, otherwise you may wind up annoying them no end. This command does not work on all sites.

/topic When you've started a new channel, use this command to let others know what it's about.

```
/topic #Amiga
```

would tell people who use /list that your channel is meant for discussing Amiga computers

/who <chan> Shows you the e-mail address of people on a particular channel.

```
/who #foo
```

would show you the addresses of everybody on channel foo

```
/who
```

by itself shows you every e-mail address for every person on IRC at the time, although be careful· on a busy night you might get a list of 500 names!

/whois Use this to get some information about a specific IRC user or to see who is online

```
/whois nickname
```

will give you the e-mail address for the person using that nickname.

```
/whois *
```

will list everybody on every channel.

/whowas Similar to /whois, gives information for people who recently signed off IRC

11.4 IRC IN TIMES OF CRISIS

IRC has become a new medium for staying on top of really big breaking news. In 1993, when Russian lawmakers barricaded themselves inside the parliament building, some enterprising Muscovites and a couple of Americans set up a "news channel" on IRC to relay first-person accounts direct from Moscow The channel was set up to provide a continuous loop of information, much like all-news radio stations that cycle through the day's news every 20 minutes In 1994, Los Angeles residents set up a similar channel to relay information related to the Northridge earthquake In both cases, logs of the channels were archived somewhere on the Net, for those unable to "tune in" live

How would you find such channels in the future? Use the /list command to scroll through the available channels If one has been set up to discuss a particular breaking event, chances are you'll see a brief description next to the channel name that will tell you that's the place to tune

11 5 MUDs

Multiple-User Dimensions or Dungeons (MUDs) take IRC into the realm of fantasy MUDs are live, role-playing games in which you enter assume a new identity and enter an alternate reality through your keyboard As you explore this other world, through a series of simple commands (such as "look," "go" and "take"), you'll run across other users, who may engage you in a friendly discussion, enlist your aid in some quest or try to kill you for no apparent reason.

Each MUD has its own personality and creator (or God) who was willing to put in the long hours required to establish the particular MUD's rules, laws of nature and information databases Some MUDs stress the social aspects of online communications -- users frequently gather online to chat and join together to build new structures or even entire realms Others are closer to "Dungeons and Dragons" and are filled with sorcerers, dragons and evil people out to keep you from completing your quest -- through murder if necessary

Many MUDs (there are also related games known as MUCKs and MUSEs) require you to apply in advance, through e-mail, for a character name and password. One that lets you look around first, though, is HoloMuck at McGill University in Montreal. The premise of this game is that you arrive in the middle of Tanstaafl, a city on the planet Holo You have to find a place to live (else you get thrown into the homeless shelter) and then you can begin exploring Magic is allowed on this world, but only outside the city limits Get bored with the city and you can roam the rest of the world or even take a trip into orbit (of course, all this takes money; you can either wait for your weekly salary or take a trip to the city casino). Once you become familiar with the city and get your own character, you can even begin erecting your own building (or subway line, or almost anything else)

To connect, telnet to

```
collatz.mcrcim mcgill edu 5757
```

When you connect, type

```
connect guest guest
```

and hit enter This connects you to the "guest" account, which has a password of "guest."
You'll see this:

```
The Homeless Shelter(#22Rna)
You wake up in the town's Homeless Shelter, where vagrants are put for
protective holding  Please don't sleep in public places-- there are plenty of
open apartments available. Type 'apartments' to see how to get to an
apartment building with open vacancies
There is a small sign on the wall here, with helpful information. Type 'look
sign' to read it
The door is standing open for your return to respectable society. Simply walk
'out' to the center.
```

Of course, you want to join respectable society, but first you want to see what that sign says. So you type

```
look sign
```

and hit enter, which brings up a list of some basic commands Then you type

```
out
```

followed by enter, which brings up this·

```
You slip out the door, and head southeast...
```

```
Tanstaafl Center
This is the center of the beautiful town of Tanstaafl. High Street runs north
and south into residential areas, while Main Street runs east and west into
business districts.
SW  is Tanstaafl Towers. Please claim an apartment.  no sleeping in public!
SE  the Public Library offers both information and entertainment
NW. is the Homeless Shelter, formerly the Town Jail.
NE. is Town Hall, site of several important services, including: Public
Message Board, Bureau of Land Management (with maps and regulations), and
other governmental/ bureaucratic help.
Down  Below a sign marked with both red and blue large letter 'U's, a
staircase leads into an underground subway passage
(Feel free to 'look' in any direction for more information )
[Obvious exits  launch, d, nw, se, w, e, n, s, ne, sw]
Contents
Instructions for newcomers
Directional signpost
Founders' statue
```

To see "Instructions for newcomers", type

```
look Instructions for newcomers
```

and hit enter You could do the same for "Directional signpost" and "Founders' statue." Then type

```
sw
```

and enter to get to Tanstaafl Towers, the city housing complex, where you have to claim an apartment (you may have to look around, many will already) be occupied. And now it's off to explore Holo! One command you'll want to keep in mind is "take." Periodically, you'll come across items that, when you take them will confer certain abilities or powers on you If you type

```
help
```

and enter, you'll get a list of files you can read to learn more about the MUD's commands

The "say" command lets you talk to other players publicly For example,

```
say Hey, I'm here!
```

would be broadcast to everybody else in the room with you. If you want to talk to just one particular person, use "whisper" instead of "say."

```
whisper agora=Hey, I'm here!
```

would be heard only by agora. Another way to communicate with somebody regardless of where on the world they are is through your pager. If you suddenly see yours go off while visiting, chances are it's a wizard checking to see if you need any help To read his message, type

```
page
```

To send him a message, type

```
page name=message
```

where name is the wizard's name (it'll be in the original message)

Other MUDs and MUCKs may have different commands, but generally use the same basic idea of letting you navigate through relatively simple English commands

When you connect to a MUD, choose your password as carefully as you would one for your host system; alas, there are MUD crackers who enjoy trying to break into other people's MUD accounts. And never, never use the same password as the one you use on your host system!

MUDs can prove highly addicting. "The jury is still out on whether MUDding is 'just a game' or 'an extension of real life with gamelike qualities'," says Jennifer Smith, an active MUD player who wrote an FAQ on the subject

She adds one caution. "You shouldn't do anything that you wouldn't do in real life, even if the world is a fantasy world. The important thing to remember is that it's the fantasy world of possibly hundreds of people, and not just yours in particular. There's a human being on the other side of each and every wire! Always remember that you may meet these other people some day, and they may break your nose People who treat others badly gradually build up bad reputations and eventually receive the NO FUN Stamp of Disapproval "

11.6 GO, GO, GO (AND CHESS, TOO)!

Fancy a good game of go or chess? You no longer have to head for the nearest park with a board in hand The Internet has a couple of machines that let you engage people from around the world in your favorite board games Or, if you prefer, you can watch matches in progress

To play go,

```
telnet hellspark.wharton.upenn.edu 6969
log on as. guest
```

You'll find prompts to various online help files to get you started

For a chess match,

```
telnet news.panix com 5000
log on as  guest
```

You'll find prompts for online help files on the system, which lets you choose your skill level

11 7 THE OTHER SIDE OF THE COIN

All is not fun and games on the Net. Like any community, the Net has its share of obnoxious characters who seem to exist only to make your life miserable (you've already met some of them in chapter 4) There are people who seem to spend a bit more time on the Net than many would find healthy It also has its criminals. Clifford Stoll writes in "The Cuckoo's Egg" how he tracked a team of German hackers who were breaking into U S computers and selling the information they found to the Soviets Robert Morris, a Cornell University student, was convicted of unleashing a "worm" program that effectively disabled several thousand computers connected to the Internet.

Of more immediate concern to the average Net user are crackers who seek to find other's passwords to break into Net systems and people who infect programs on ftp sites with viruses

There is a widely available program known as "Crack" that can decipher user passwords composed of words that might be found in a dictionary (this is why you shouldn't use such passwords) Short of that, there are the annoying types who take a special thrill in trying to make you miserable The best advice in dealing with them is to count to 10 and then ignore them -- like juveniles everywhere, most of their fun comes in seeing how upset you can get.

Meanwhile, two Cornell University students pleaded guilty in 1992 to uploading virus-infected Macintosh programs to ftp sites If you plan to try out large amounts of software from ftp sites, it might be wise to download or buy a good anti-viral program.

But can law enforcement go too far in seeking out the criminals?

The Electronic Frontier Foundation was founded in large part in response to a series of government raids against an alleged gang of hackers. The raids resulted in the near bankruptcy of one game company never alleged to have had anything to do with the hackers, when the government seized its computers and refused to give them back. The case against another alleged participant collapsed in court when his attorney showed the "proprietary" and supposedly hacked information he printed in an electronic newsletter was actually available via an 800 number for about $13 -- from the phone company from which that data was taken.

11.8 FYI

You can find discussions about IRC in the alt.irc newsgroup.

"A Discussion on Computer Network Conferencing," by Darren Reed (May, 1992), provides a theoretical background on why conferencing systems such as IRC are a Good Thing. It's available through ftp at nic.ddn.mil in the rfc directory as rfc1324.txt.

Every Friday, Scott Goehring posts a new list of MUDs and related games and their telnet addresses in the newsgroup rec.games.mud.announce. There are several other mud newsgroups related to specific types of MUDs, including rec.games.mud.social, rec.games.mud.adventure, rec.games.mud.tiny, rec.games.mud.diku and rec.games.mud.lp.

For a good overview of the impact on the Internet of the Morris Worm, read "Virus Highlights Need for Improved Internet Management," by the U.S. General Accounting Office (June, 1989). You can get a copy via ftp from cert.sei.cmu.edu in the pub/virus-l/docs directory. It's listed as gao_rpt.

Clifford Stoll describes how the Internet works and how he tracked a group of KGB-paid German hackers through it, in "The Cuckoo's Egg. Tracking a Spy through the Maze of Computer Espionage," Doubleday (1989).

Chapter 12 EDUCATION AND THE NET

12 1 THE NET IN THE CLASSROOM

If you're a teacher, you've probably already begun to see the potential the Net has for use in the class. Usenet, ftp and telnet have tremendous educational potential, from keeping up with world events to arranging international science experiments

Because the Net now reaches so many countries and often stays online even when the phones go down, you and your students can "tune in" to first-hand accounts during international conflicts. Look at your system's list of Usenet soc.culture groups to see if there is one about the country or region you're interested in Even in peacetime, these newsgroups can be great places to find people from countries you might be studying.

The biggest problem may be getting accounts for your students, if you're not lucky enough to live within the local calling area of a Free-Net system Many colleges and universities, however, are willing to discuss providing accounts for secondary students at little or no cost Several states, including California and Texas, have Internet-linked networks for teachers and students.

12.2 SOME SPECIFIC RESOURCES FOR STUDENTS AND TEACHERS

In addition, there are a number of resources on the Internet aimed specifically at elementary and secondary students and teachers. You can use these to set up science experiments with classes in another country, learn how to use computers in the classroom or keep up with the latest advances in teaching everything from physics to physical education

Among them.

AskERIC Run by the Educational Resource and Information Center, AskERIC provides a way for educators, librarians and others interested in K-12 education to get more information about virtually everything. The center maintains an e-mail address (askeric@ericir.syr.edu) for questions and promises answers within 48 hours. It also maintains a gopher site that contains digests of questions and answers, lesson plans in a variety of fields and other educationally related information The gopher address is ericir syr.edu

Health-Ed: A mailing list for health educators. Send a request to health-ed-request@stjhmc fidonet.org

K12Net. Begun on the Fidonet hobbyist network, K12Net is now also carried on many Usenet systems and provides a host of interesting and valuable services. These include international chat for students, foreign-language discussions (for example, there are French and German-only conference where American students can practice those languages with students from Quebec and German) There are also conferences aimed at teachers of specific subjects, from physical education to physics The K12 network still has limited distribution, so ask your system administrator if your system carries it

Kidsphere. Kidsphere is a mailing list for elementary and secondary teachers, who use it to arrange joint projects and discuss educational telecommunications. You will find news of new software, lists of sites from which you can get computer-graphics pictures from various NASA satellites and probes and other news of interest to modem-using teachers.

To subscribe, send a request by e-mail to kidsphere-request@vms cis pitt.edu or joinkids@vms cis pitt.edu and you will start receiving messages within a couple of days

To contribute to the discussion, send messages to kidsphere@vms cis pitt edu.

KIDS is a spin-off of KIDSPHERE just for students who want to contact students. To subscribe, send a request to joinkids@vms.cis.pitt.edu, as above To contribute, send messages to kids@vms.cist.pitt edu

Knoxville News-Sentinel Online Using the newspaper in the electronic classroom. This gopher site lets students and teachers connect to the newspaper, and provides resources for them derived from the newsroom. Use gopher to connect to gopher opup org

MicroMUSE This is an online, futuristic city, built entirely by participants (see chapter 11 for information on MUSEs and MUDs in general). Hundreds of students from all over have participated in this educational exercise, coordinated by MIT. Telnet to michael.ai.mit edu. Log on as guest and then follow the prompts for more information.

NASA Spacelink· This system, run by NASA in Huntsville, Ala., provides all sorts of reports and data about NASA, its history and its various missions, past and present Telnet spacelink msfc nasa.gov or 128 158.13.250

When you connect, you'll be given an overview of the system and asked to register. The system maintains a large file library of GIF-format space graphics, but note that you can't download these through telnet If you want to, you have to dial the system directly, at (205) 895-0028 Many can be obtained through ftp from ames arc nasa.gov, however

Newton· Run by the Argonne National Laboratory, it offers conferences for teachers and students, including one called "Ask a Scientist."

Telnet newton dep.anl.gov
Log in as: cocotext

You'll be asked to provide your name and address. When you get the main menu, hit 4 for the various conferences The "Ask a Scientist" category lets you ask questions of scientists in fields from biology to earth science. Other categories let you discuss teaching, sports and computer networks

OERI The U.S. Department of Education's Office of Educational Resources and Improvement runs a gopher system that provides numerous educational resources, information and statistics for teachers Use gopher to connect to

gopher ed gov.

Spacemet Forum· If your system doesn't carry the K12 conferences, but does provide you with telnet, you can reach the conferences through SpaceMet Forum, a bulletin-board system aimed at teachers and students that is run by the physics and astronomy department at the University of Massachusetts at Amherst.

Telnet: spacemet phast.umass edu.

When you connect, hit escape once, after which you'll be asked to log on Like K12Net, SpaceMet Forum began as a Fidonet system, but has since grown much larger Mort and Helen Sternheim, professors at the university, started SpaceMet as a one-line bulletin-board system several years ago to help bolster middle-school science education in nearby towns.

In addition to the K12 conferences, SpaceMet carries numerous educationally oriented conferences It also has a large file library of interest to educators and students, but be aware that getting files to your site could be difficult and maybe even impossible. Unlike most other Internet sites, Spacemet does not use an ftp interface The Sternheims say ZMODEM sometimes works over the network, but don't count on it

12 3 USENET AND BITNET IN THE CLASSROOM

There are numerous Usenet newsgroups of potential interest to teachers and students

As you might expect, many are of a scientific bent. You can find these by typing l sci in rn or using nngrep sci. for nn. There are now close to 40, with subjects ranging from archaeology to economics (the "dismal science," remember?) to astronomy to nanotechnology (the construction of microscopically small machines).

One thing students will quickly learn from many of these groups. science is not just dull, boring facts. Science is argument and standing your ground and making your case The Usenet sci groups encourage critical thinking

Beyond science, social-studies and history classes can keep busy learning about other countries, through the soc.culture newsgroups

Most of these newsgroups originated as ways for expatriates of a given country to keep in touch with their homeland and its culture In times of crisis, however, these groups often become places to disseminate information from or into the country and to discuss what is happening From Afghanistan to Yugoslavia, close to 50 countries are now represented on Usenet To see which groups are available, use l soc culture in rn or nngrep soc culture for nn.

Several "talk" newsgroups provide additional topical discussions, but teachers should screen them first before recommending them to students They range from talk.abortion and talk politics guns to talk politics.space and talk environment

One caveat Teachers might want to peruse particular newsgroups before setting their students loose in them. Some have higher levels of flaming and blather than others.

There are also a number of Bitnet discussion groups of potential interest to students and teachers See Chapter 5 for information on finding and subscribing to Bitnet discussion groups Some with an educational orientation include.

biopi-l	ksuvm bitnet	Secondary biology education
chemed-l	uwf.bitnet	Chemistry education
dts-l	iubvm bitnet	The Dead Teacher's Society list
phys-l	uwf.bitnet	Discussions for physics teachers
physhare	psuvm bitnet	Where physics teachers share resources
scimath-l	psuvm.bitnet	Science and math education

To get a list of ftp sites that carry astronomical images in the GIF graphics format, use ftp to connect to nic funet.fi Switch to the /pub/astro/general directory and get the file astroftp.txt. Among the sites listed is ames arc nasa.gov, which carries images taken by the Voyager and Galileo probes, among other pictures

CHAPTER 13 Business on the Net

13 1 SETTING UP SHOP

Back in olden days, oh, before 1990 or so, there were no markets in the virtual community -- if you wanted to buy a book, you still had to jump in your car and drive to the nearest bookstore

This was because in those days, the Net consisted mainly of a series of government-funded networks on which explicit commercial activity was forbidden Today, much of the Net is run by private companies, which generally have no such restrictions, and a number of companies have begun experimenting with online "shops" or other services Many of these shops are run by booksellers, while the services range from delivery of indexed copies of federal documents to an online newsstand that hopes to entice you to subscribe to any of several publications (of the printed on paper variety). A number of companies also use Usenet newsgroups (in the biz hierarchy) to distribute press releases and product information.

Still, commercial activity on the remains far below that found on other networks, such as CompuServe, with its Electronic Mall, or Prodigy, with its advertisements on almost every screen In part that's because of the newness and complexity of the Internet as a commercial medium In part, however, that is because of security concerns Companies worry about such issues as crackers getting into their system over the network, and many people do not like the idea of sending a credit-card number via the Internet (an e-mail message could be routed through several sites to get to its destination). These concerns could disappear as Net users turn to such means as message encryption and "digital signatures." In the meantime, however, businesses on the Net can still consider themselves something of Internet pioneers

A couple of public-access sites and a regional network have set up "marketplaces" for online businesses

The World in Brookline, Mass , currently rents "space" to several bookstores and computer-programming firms, as well as an "adult toy shop " To browse their offerings, use gopher to connect to

world std.com

At the main menu, select "Shops on the World."

Msen in Ann Arbor provides its "Msen Marketplace," where you'll find a travel agency and an "Online Career Center" offering help-wanted ads from across the country Msen also provides an "Internet Business Pages," an online directory of companies seeking to reach the Internet community. You can reach Msen through gopher at

gopher msen com

At the main menu, select "Msen Marketplace."

The Nova Scotia Technology Network runs a "Cybermarket" on its gopher service at

nstn ns.ca

There, you'll find an online bookstore that lets you order books through e-mail (to which you'll have to trust your credit-card number) and a similar "virtual record store " Both let you search their wares by keyword or by browsing through catalogs.

Other online businesses include.

AnyWare Associates	This Boston company runs an Internet-to-fax gateway that lets you send fax message anywhere in the world via the Internet (for a fee, of course). For more information, write sales@awa.com
Bookstacks Unlimited	This Cleveland bookstore offers a keyword-searchable database of thousands of books for sale. Telnet books com
Counterpoint Publishing	Based in Cambridge, Mass., this company's main Internet product is indexed versions of federal journals, including the Federal Register (a daily compendium of government contracts, proposed regulations and the like). Internet users can browse through recent copies, but complete access will run several thousand dollars a year. Use gopher to connect to enews com and select "Counterpoint Publishing"
Dialog	The national database company can be reached through telnet at

	dialog com To log on, however, you will have first had to set up a Dialog account.
Dow Jones News Retrieval	A wire service run by the information company that owns the Wall Street Journal Available via telnet at djnr dowjones com As with Dialog, you need an account to log on.
Infinity Link	Browse book, music, software, video-cassette and laser-disk catalogs through this system based in Malvern, Penn. Use gopher to connect to columbia.ilc com Log on as: cas
The Internet Company	Sort of a service bureau, this company, based in Cambridge, Mass , is working with several publishers on Internet-related products. Its Electronic Newsstand offers snippets and special subscription rates to a number of national magazines, from the New Republic to the New Yorker Use gopher to connect to enews.com
MarketBase	You can try the classified-ads system developed by this company in Santa Barbara, Calif., by gopher to connect to mb com
O'Reilly and Associates	Best known for its "Nutshell" books on Unix, O'Reilly runs three Internet services The gopher server, at ora.com provides information about the company and its

books It posts similar information in the biz.oreilly.announce Usenet newsgroup Its Global Network Navigator, accessible through the World-Wide Web, is a sort of online magazine that lets users browse through interesting services and catalogs.

13.2 FYI

The com-priv mailing list is the place to discuss issues surrounding the commercialization and the privatization of the Internet To subscribe (or un-subscribe), send an e-mail request to com-priv-request@psi.com

Mary Cronin's book, "Doing Business on the Internet" (1994, Van Nostrand Reinhold), takes a more in-depth look at the subject.

Kent State University in Ohio maintains a repository of "Business Sources on the Net " Use gopher to connect to refmac.kent.edu

Chapter 14: CONCLUSION -- THE END?

The revolution is just beginning New communications systems and digital technologies have already meant dramatic changes in the way we live Think of what is already routine that would have been considered impossible just ten years ago You can browse through the holdings of your local library -- or of libraries halfway around the world -- do your banking and see if your neighbor has gone bankrupt, all through a computer and modem

Imploding costs coupled with exploding power are bringing ever more powerful computer and digital systems to ever growing numbers of people. The Net, with its rapidly expanding collection of databases and other information sources, is no longer limited to the industrialized nations of the West; today the web extends from Siberia to Zimbabwe. The cost of computers and modems used to plug into the Net, meanwhile, continue to plummet, making them ever more affordable.

Cyberspace has become a vital part of millions of people's daily lives. People form relationships online, they fall in love, they get married, all because of initial contacts in cyberspace, that ephemeral ``place" that transcends national and state boundaries Business deals are transacted entirely in ASCII Political and social movements begin online, coordinated by people who could be thousands of miles apart

Yet this is only the beginning

We live in an age of communication, yet the various media we use to talk to one another remain largely separate systems. One day, however, your telephone, TV, fax machine and personal computer will be replaced by a single ``information processor" linked to the worldwide Net by strands of optical fiber.

Beyond databases and file libraries, power will be at your fingertips Linked to thousands, even millions of like-minded people, you'll be able to participate in social and political movements across the country and around the world.

How does this happen? In part, it will come about through new technologies. High-definition television will require the development of inexpensive computers that can process as much information as today's workstations Telephone and cable companies will cooperate, or in some cases compete, to bring those fiber-optic cables into your home.

The Clinton administration, arguably the first led by people who know how to use not only computer networks but computers, is pushing for creation of a series of "information superhighways" comparable in scope to the Interstate highway system of the 1950s (one of whose champions in the Senate has a son elected vice president in 1992).

Right now, we are in the network equivalent of the early 1950s, just before the creation of that massive highway network Sure, there are plenty of interesting things out there, but you have to meander along two-lane roads, and have a good map, to get to them.

Creation of this new Net will require more than just high-speed channels and routing equipment; it will require a new communications paradigm the Net as information utility. The Net remains a somewhat complicated and mysterious place. To get something out of the Net today, you have to spend a fair amount of time with a Net veteran or a manual like this You have to learn such arcana as the vagaries of the Unix cd command.

Contrast this with the telephone, which now also provides access to large amounts of information through push buttons, or a computer network such as Prodigy, which one navigates through simple commands and mouse clicks

Internet system administrators have begun to realize that not all people want to learn the intricacies of Unix, and that that fact does not make them bad people We are already seeing the development of simple interfaces that will put the Net's power to use by millions of people You can already see their influence in the menus of gophers and the World-Wide Web, which require no complex computing skills but which open the gates to thousands of information resources. Mail programs and text editors such as pico and pine promise much of the power of older programs such as emacs at a fraction of the complexity

Some software engineers are taking this even further, by creating graphical interfaces that will let somebody navigate the Internet just by clicking on the screen with a mouse or by calling up an easy text editor, sort of the way one can now navigate a Macintosh computer -- or a commercial online service such as Prodigy.

Then there are the Internet services themselves.

For every database now available through the Internet, there are probably three or four that are not Government agencies are only now beginning to connect their storehouses of information to the Net Several commercial vendors, from database services to booksellers, have made their services available through the Net.

Few people now use one of the Net's more interesting applications A standard known as MIME lets one send audio and graphics files in a message Imagine opening your e-mail one day to hear your granddaughter's first words, or a "photo" of your friend's new house Eventually, this standard could allow for distribution of even small video displays over the Net

All of this will require vast new amounts of Net power, to handle both the millions of new people who will jump onto the Net and the new applications they want Replicating a moving image on a computer screen alone takes a phenomenal amount of computer bits, and computing power to arrange them

All of this combines into a National Information Infrastructure able to move billions of bits of information in one second -- the kind of power needed to hook information "hoses" into every business and house.

As these "superhighways" grow, so will the "on ramps," for a high-speed road does you little good if you can't get to it. The costs of modems seem to fall as fast as those of computers. High-speed modems (9600 baud and up) are becoming increasingly affordable. At 9600 baud, you can download a satellite weather image of North America in less than two minutes, a file that, with a slower modem could take up to 20 minutes to download. Eventually, homes could be connected directly to a national digital network. Most long-distance phone traffic is already carried in digital form, through high-volume optical fibers. Phone companies are ever so slowly working to extend these fibers the "final mile" to the home. The Electronic Frontier Foundation is working to ensure these links are affordable.

Beyond the technical questions are increasingly thorny social, political and economic issues. Who is to have access to these services, and at what cost? If we live in an information age, are we laying the seeds for a new information under class, unable to compete with those fortunate enough to have the money and skills needed to manipulate new communications channels? Who, in fact, decides who has access to what? As more companies realize the potential profits to be made in the new information infrastructure, what happens to such systems as Usenet, possibly the world's first successful anarchistic system, where everybody can say whatever they want?

What are the laws of the electronic frontier? When national and state boundaries lose their meaning in cyberspace, the question might even be: WHO is the law? What if a practice that is legal in one country is "committed" in another country where it is illegal, over a computer network that crosses through a third country? Who goes after computer crackers?

What role will you play in the revolution?

Appendix A: THE LINGO

Like any community, the Net has developed its own language. What follows is a glossary of some of the more common phrases you'll likely run into But it's only a small subset of net speak You an find a more complete listing in "The New Hacker's Dictionary," compiled by Eric Raymond (MIT Press). Raymond's work is based on an online reference known as "The Jargon File," which you can get through anonymous ftp from ftp gnu mit ai.mit as jarg300.txt.gz in the pub/gnu directory (see chapter 7 for information on how to un-compress a gz file)

ASCII	Has two meanings ASCII is a universal computer code for English letters and characters. Computers store all information as binary numbers. In ASCII, the letter "A" is stored as 01000001, whether the computer is made by IBM, Apple or Commodore. ASCII also refers to a method, or protocol, for copying files from one computer to another over a network, in which neither computer checks for any errors that might have been caused by static or other problems.
ANSI	Computers use several different methods for deciding how to put information on your screen and how your keyboard interacts with the screen ANSI is one of these "terminal emulation" methods Although most popular on PC-based bulletin-board systems, it can also be found on some Net sites. To use it properly, you will first have to turn it on, or enable it, in your communications software
ARPANet	A predecessor of the Internet. Started in 1969 with funds from the Defense Department's Advanced Projects Research Agency
backbone	A high-speed network that connects several powerful computers In the U.S , the backbone of the Internet is often considered the NSFNet, a government funded link between a handful of supercomputer sites across the country
Baud	The speed at which modems transfer data. One baud is roughly equal to one bit per second. It takes eight bits to make up one letter or character. Modems rarely transfer data at exactly the same speed as their listed

baud rate because of static or computer problems More expensive modems use systems, such as Microcom Network Protocol (MNP), which can correct for these errors or which "compress" data to speed up transmission

BITNet	Another, academically oriented, international computer network, which uses a different set of computer instructions to move data. It is easily accessible to Internet users through e-mail, and provides a large number of conferences and databases. Its name comes from "Because It's Time." "
Bounce	What your e-mail does when it cannot get to its recipient -- it bounces back to you -- unless it goes off into the ether, never to be found again
Command line	On Unix host systems, this is where you tell the machine what you want it to do, by entering commands
Communications software	A program that tells a modem how to work
Daemon	An otherwise harmless Unix program that normally works out of sight of the user. On the Internet, you'll most likely encounter it only when your e-mail is not delivered to your recipient -- you'll get back your original message plus an ugly message from a "mailer daemon
Distribution	A way to limit where your Usenet postings go Handy for such things as "for sale" messages or discussions of regional politics.
Domain	The last part of an Internet address, such as "news com."
Dot	When you want to impress the net veterans you meet at parties, say "dot" instead of "period," for example. "My address is john at site dot domain dot com "
Dot file	A file on a Unix public-access system that alters the way you or your messages interact with that system For example, your .login file contains various parameters for such things as the text editor you get when you send a message. When you do an ls command, these files do not appear in the directory listing; do ls

-a to list them.

Down	When a public-access site runs into technical trouble, and you can no longer gain access to it, it's down.
Download	Copy a file from a host system to your computer. There are several different methods, or protocols, for downloading files, most of which periodically check the file as it is being copied to ensure no information is inadvertently destroyed or damaged during the process Some, such as XMODEM, only let you download one file at a time Others, such as batch-YMODEM and ZMODEM, let you type in the names of several files at once, which are then automatically downloaded.
EMACS	A standard Unix text editor preferred by Unix types that beginners tend to hate.
E-mail	Electronic mail -- a way to send a private message to somebody else on the Net Used as both noun and verb
Emoticon	See smiley
F2F	Face to Face When you actually meet those people you been corresponding with/flaming
FAQ	Frequently Asked Questions A compilation of answers to these. Many Usenet newsgroups have these files, which are posted once a month or so for beginners
Film at 11	One reaction to an overwrought argument: "Imminent death of the Net predicted. Film at 11 "
Finger	An Internet program that lets you get some bit of information about another user, provided they have first created a plan file.
Flame	Online yelling and/or ranting directed at somebody else. Often results in flame wars, which occasionally turn into holy wars (see).
Followup	A Usenet posting that is a response to an earlier message.
Foo/foobar	A sort of online algebraic place holder, for example: "If

	you want to know when another site is run by a for-profit company, look for an address in the form of foo@foobar.com "
Fortune cookie	An inane/witty/profund comment that can be found around the net.
Freeware	Software that doesn't cost anything
FTP	File-transfer Protocol. A system for transferring files across the Net.
Get a life	What to say to somebody who has, perhaps, been spending a wee bit too much time in front of a computer
GIF	Graphic Interchange Format. A format developed in the mid-1980s by CompuServe for use in photo-quality graphics images Now commonly used everywhere online.
GNU	Gnu's Not Unix A project of the Free Software Foundation to write a free version of the Unix operating system
Hacker	On the Net, unlike among the general public, this is not a bad person, it is simply somebody who enjoys stretching hardware and software to their limits, seeing just what they can get their computers to do What many people call hackers, net.denizens refer to as crackers
Handshake	Two modems trying to connect first do this to agree on how to transfer data
Hang	When a modem fails to hang up
Holy war	Arguments that involve certain basic tenets of faith, about which one cannot disagree without setting one of these off For example. IBM PCs are inherently superior to Macintoshes.
Host system	A public-access site; provides Net access to people outside the research and government community
IMHO	In My Humble Opinion
Internet	A worldwide system for linking smaller computer

	networks together. Networks connected through the Internet use a particular set of communications standards to communicate, known as TCP/IP
Killfile	A file that lets you filter Usenet postings to some extent, by excluding messages on certain topics or from certain people.
Log on/log in	Connect to a host system or public-access site.
Log off	Disconnect from a host system
Lurk	Read messages in a Usenet newsgroup without ever saying anything.
Mailing list	Essentially a conference in which messages are delivered right to your mailbox, instead of to a Usenet newsgroup You get on these by sending a message to a specific e-mail address, which is often that of a computer that automates the process
MOTSS	Members of the Same Sex. Gays and Lesbians online. Originally an acronym used in the 1980 federal census.
Net god	One who has been online since the beginning, who knows all and who has done it all.
Net.personality	Somebody sufficiently opinionated/flaky/with plenty of time on his hands to regularly post in dozens of different Usenet newsgroups, whose presence is known to thousands of people.
Net police	Derogatory term for those who would impose their standards on other users of the Net. Often used in vigorous flame wars (in which it occasionally mutates to net.nazis)
Netiquette	A set of common-sense guidelines for not annoying others
Network	A communications system that links two or more computers. It can be as simple as a cable strung between two computers a few feet apart or as complex as hundreds of thousands of computers around the world linked through fiber optic cables, phone lines and satellites.

Newbie	Somebody new to the Net. Sometimes used derogatorily by net veterans who have forgotten that, they, too, were once newbies who did not innately know the answer to everything. "Clueless newbie" is always derogatory
Newsgroup	A Usenet conference.
NIC	Network Information Center. As close as an Internet-style network gets to a hub, it's usually where you'll find information about that particular network
NSA line eater	The more aware/paranoid Net users believe that the National Security Agency has a super-powerful computer assigned to reading everything posted on the Net They will jokingly (?) refer to this line eater in their postings Goes back to the early days of the Net when the bottom lines of messages would sometimes disappear for no apparent reason.
NSF	National Science Foundation. Funds the NSFNet, a high-speed network that once formed the backbone of the Internet in the U S
Offline	When your computer is not connected to a host system or the Net, you are offline
Online	When your computer is connected to an online service, bulletin-board system or public-access site
Ping	A program that can trace the route a message takes from your site to another site.
plan file	A file that lists anything you want others on the Net to know about you You place it in your home directory on your public-access site Then, anybody who fingers (see) you, will get to see this file.
Post	To compose a message for a Usenet newsgroup and then send it out for others to see.
Postmaster	The person to contact at a particular site to ask for information about the site or complain about one of his/her user's behavior.

Protocol	The method used to transfer a file between a host system and your computer There are several types, such as Kermit, YMODEM and ZMODEM.
Prompt	When the host system asks you to do something and waits for you to respond. For example, if you see "login:" it means type your user name.
README files	Files found on FTP sites that explain what is in a given FTP directory or which provide other useful information (such as how to use FTP).
Real Soon Now	A vague term used to describe when something will actually happen.
RFC	Request for Comments A series of documents that describe various technical aspects of the Internet.
ROTFL	Rolling on the Floor Laughing How to respond to a particularly funny comment
ROT13	A simple way to encode bad jokes, movie reviews that give away the ending, pornography, etc Essentially, each letter in a message is replace by the letter 13 spaces away from it in the alphabet. There are online decoders to read these, nn and rn have them built in
RTFM	Read the, uh, you know, Manual. Often used in flames against people who ask computer-related questions that could be easily answered with a few minutes with a manual More politely: RTM
Screen capture	A part of your communications software that opens a file on your computer and saves to it whatever scrolls past on the screen while connected to a host system.
Server	A computer that can distribute information or files automatically in response to specifically worded e-mail requests.
Shareware	Software that is freely available on the Net. If you like and use the software, you should send in the fee requested by the author, whose name and address will be found in a file distributed with the software.

.sig file	Sometimes, signature file A file that, when placed in your home directory on your public-access site, will automatically be appended to every Usenet posting you write.
sig quote	A profound/witty/quizzical/whatever quote that you include in your sig file.
Signal-to-noise ratio	The amount of useful information to be found in a given Usenet newsgroup. Often used derogatorily, for example: "the signal-to-noise ratio in this newsgroup is pretty low "
SIMTEL20	The White Sands Missile Range used to maintain a giant collection of free and low-cost software of all kinds, which was "mirrored" to numerous other ftp sites on the Net. In the fall of 1993, the Air Force decided it had better things to do than maintain a free software library and shut it down But you'll still see references to the collection, known as SIMTEL20, around the Net
Smiley	A way to describe emotion online. Look at this with your head tilted to the left :-). There are scores of these smileys, from grumpy to quizzical.
Snail mail	Mail that comes through a slot in your front door or a box mounted outside your house
Sysadmin	The system administrator; the person who runs a host system or public-access site
Sysop	A system operator Somebody who runs a bulletin-board system.
TANSTAAFL	There Ain't No Such Thing as a Free Lunch.
TCP/IP	Transmission Control Protocol/Internet Protocol The particular system for transferring information over a computer network that is at the heart of the Internet.
Telnet	A program that lets you connect to other computers on the Internet.
Terminal emulation	There are several methods for determining how your keystrokes and screen interact with a public-access

site's operating system Most communications programs offer a choice of "emulations" that let you mimic the keyboard that would normally be attached directly to the host-system computer

UUCP	Unix-to-Unix CoPy. A method for transferring Usenet postings and e-mail that requires far fewer net resources than TCP/IP, but which can result in considerably slower transfer times
Upload	Copy a file from your computer to a host system
User name	On most host systems, the first time you connect you are asked to supply a one-word user name This can be any combination of letters and numbers
VT100	Another terminal-emulation system Supported by many communications program, it is the most common one in use on the Net. VT102 is a newer version.

Appendix B General Information About the Electronic Frontier Foundation

The Electronic Frontier Foundation (EFF) is a membership organization that was founded in July of 1990 to ensure that the principles embodied in the Constitution and the Bill of Rights are protected as new communications technologies emerge

From the beginning, EFF has worked to shape our nation's communications infrastructure and the policies that govern it in order to maintain and enhance First Amendment, privacy and other democratic values. We believe that our overriding public goal must be the creation of Electronic Democracy, so our work focuses on the establishment of:

o new laws that protect citizens' basic Constitutional rights as they use new communications technologies,

o a policy of common carriage requirements for all network providers so that all speech, no matter how controversial, will be carried without discrimination,

o a National Public Network where voice, data and video services are accessible to all citizens on an equitable and affordable basis, and

o a diversity of communities that enable all citizens to have a voice in the information age

Join us!

I wish to become a member of the Electronic Frontier Foundation. I enclose:

$__________ Regular membership -- $40
$__________ Student membership -- $20

Special Contribution

I wish to make a tax-deductible donation in the amount of $_________ to further support the activities of EFF and to broaden participation in the organization.

Documents Available in Hard Copy Form

The following documents are available free of charge from the Electronic Frontier Foundation Please indicate any of the documents you wish to receive

___ Open Platform Proposal - EFF's proposal for a national telecommunications infrastructure. 12 pages. July, 1992

___ An Analysis of the FBI Digital Telephony Proposal - Response of EFF-organized coalition to the FBI's digital telephony proposal of Fall, 1992. 8 pages. September, 1992

___ Building the Open Road. The NREN and the National Public Network - A discussion of the National Research and Education Network as a prototype for a National Public Network. 20 pages. May, 1992.

___ Innovative Services Delivered Now: ISDN Applications at Home, School, the Workplace and Beyond - A compilation of ISDN applications currently in use 29 pages. January, 1993.

___ Decrypting the Puzzle Palace - John Perry Barlow's argument for strong encryption and the need for an end to U.S policies preventing its development and use. 13 pages. May, 1992.

___ Crime and Puzzlement - John Perry Barlow's piece on the founding of the Electronic Frontier Foundation and the world of hackers, crackers and those accused of computer crimes 24 pages. June, 1990.

___ Networks & Policy - A quarterly newsletter detailing EFF's activities and achievements.

Your Contact Information

Name ______________________________________

Organization ________________________________

Address ____________________________________

____

Phone: (___) ______________ FAX. (___) ______________ (optional)

E-mail address: ______________________________________

Payment Method

___ Enclosed is a check payable to the Electronic Frontier Foundation.

___ Please charge my.
___ MasterCard ___ Visa ___ American Express

Card Number ______________________________

Expiration Date: ____________________________

Signature ________________________________

Privacy Policy

EFF occasionally shares our mailing list with other organizations promoting similar goals. However, we respect an individual's right to privacy and will not distribute your name without explicit permission

___ I grant permission for the EFF to distribute my name and contact information to organizations sharing similar goals.

Print out and mail to
Membership Coordinator
Electronic Frontier Foundation
1001 G Street, N.W
Suite 950 East
Washington, DC 20001
202/347-5400 voice
202/393-5509 fax

The Electronic Frontier Foundation is a nonprofit, 501(c)(3) organization supported by contributions from individual members, corporations and private foundations. Donations are tax-deductible

Searching the Internet

The two most common ways to retrieve information on the Web are directories and search engines. The difference between the two is that while directories merely list sites submitted to them, like the Yellow Pages, search engines like Alta Vista have technology that actually finds the sites containing key words you have requested and offers up an organized list for you

Search Engines

A web search engine is an interactive tool that enables users to locate information available via the World Wide Web. Search engines provide "fill-out" forms and other interfaces so the user can type in a query, submit the request, and retrieve a list of resources that match the search criteria. The hypertext environment makes it possible to offer a link directly from the list of results to the resources themselves.

A single search engine cannot cover every available web resource, but many do contain references to millions of resources Results may vary from one search engine to the next.

Knowing how best to wade through the results will make your search more useful With Alta Vista, for example, search results are ranked by confidence. A query returns a list of sites ranked by how closely the key words match

A tip The best searches result from reading and using the "Tips" for searches, which are given with every search engine.

Web directories

A web directory or index collects and organizes resources that are available via the World Wide Web, and is designed to provide a starting point for locating information Web indexes may be organized in a variety of ways, including alphabetically and topically, and generally offer users the option of connecting directly to the resources listed

Web indexes are not a comprehensive repository of all the information available, although they can list thousands of resources Search options are sometimes provided at the index site to assist users with locating resources within the index.

Some Internet navigation tools

Here, we are providing a collection of navigation tools to search the Internet. But before you start searching, we recommend that you once go through Internet searching strategies And also at any time in future, Quick guide for Internet searching will provide you a quick and brief description of the most common search engines

See also
Search tool reviews

[Back to main page | Internet searching strategies | Quick guide to search tools | Internet navigation tools | Reviews]

Internet Searching Strategies

Contents

1 Formulating a Strategy
2 Maximizing Your Search Results
3. Evaluating Internet Resources
4. Citing Internet Resources

Formulating a Strategy

1. Decide if your topic is likely to be addressed on the Internet You will find excellent Internet resources for:
    - Computers, engineering, physics
    - Natural sciences.
    - Government information
    - Product/business information
    - Popular culture.

   You will find less information (although this is rapidly changing) about:
    - Humanities (literature, history, philosophy, and the arts)
    - Social sciences (anthropology, sociology, psychology, education).

2. Decide on how current materials have to be to suit your needs
    - Expect to find mostly current information on the Internet
    - However, the expection is that information posted on the Internet will be updated frequently--often, it is not
    - Expect to find some older materials, particularly materials whose copyright has expired (usually more than 75 years old)

3 Choose a type of Internet resource that will reflect what you need.
    - For a search of many, many Internet resources, choose Alta Vista
    - To search resources by subject area, choose Yahoo.
    - To search several WWW indexes at the same time, try MetaCrawler.
    - To locate text files (gopher sites), use Veronica.
    - To locate software, select Archie.
    - To find a telnet address of a library catalog, choose HyTelnet
    - To browse Internet mailing lists, select Liszt.
    - To search usenet news, try DejaNews
    - To find an email address, search WhoWhere?.
    - See the searching quickguide for more specific information.

4 Narrow your search
    - Checking the sites the search engine returned will automatically narrow your search! Since many of the search engines do not regularly update their links, some of the sites they return will no longer be available.
    - All the search engines feature a link to an "advanced search," with instructions on how to combine or eliminate terms.
    - Most of the search engines use OR as a default. This means that you will get a list of sites that include one of any of the terms you used to search. If you search for blue moon, you will get a list of sites for blue suede shoes, moon pies, etc.
    - To retrieve sites with all the terms you have entered, try AND or +. To eliminate terms, try NOT or -. To search for a phrase, try WITH or put quotation marks around it ("blue moon").
    - Most of the search engines will ignore and, not, with, adj in the lowercase
    - Vary your vocabulary. Try cyan, azure, or cornflower instead of blue.

- Vary your spelling The Internet is a global network, so, to search on the word color, try color and colour, and maybe even Farbe or couleur.
- Truncate your words, usually with a * (for instance, color* will turn up coloring, colors, colorized).

Maximizing Your Search Results

1. Search within site itself.
    - Many sites offer internal search engines, that is, search features that will look throughout a collection of web pages
2. Hack down the URL of a good site.
    - For instance, you can cut the /Fondren/Netguides/strategies html off of this URL and get to RiceInfo's main page.
3. Alter the URL.
    - Change http.// to gopher // or ftp // and you may discover text files or software at the site
4. Save your search.
    - If the address contains "cgi-bin", you should be able to bookmark it and return to it later.

Evaluating Internet Resources

1. Look at the URL to determine what type of organization produced the site
    - .com is a commercial site.
    - .edu is an academic site
    - gov is a government site
    - org is usually a non-profit organization
    - net is a networked service provider
    - mil is a military site

   New Domain names.
    - arts for cultural and entertainment groups
    - firm for businesses
    - store for businesses offering goods to purchase
    - web for entities emphasizing activities related to the WWW.
    - rec for entities emphasizing recreational activities
    - info for information service providers
2. Look at the URL to determine who produced the site (or who posted it, at least)
    - ~name is usually someone's name, or part of their name
    - You can try to look them up by partial name and insistution in WhoWhere?
3. Consider the following questions
    - Is an author listed?
    - What are the credentials of the author?
    - Is there a bias or a commercial interest?
    - Who is the intended audience of the page?
    - How current is the information?
    - Are references, citations, or links to other resources included?
4. Look at other reviews.
    - Magellan
    - Point Communications
    - Excite NetReviews

Citing Internet Resources

1. List the author's name, if it is given
2. List the title of the page
3. List the URL.
4. Indicate the date you visited the page (Web pages often do not list the date they were created or updated, so this is a way of indicating how current the information may be).
5. For more specific information, refer to online style guides for citing electronic sources
    - Electronic Style Guides for APA and MLA
    - MLA's Guide to Electronic Citation
    - SUNY-Binghamton's excellent guide to Citing Electronic Resources

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Internet Searching QuickGuide

You are searching for...	Best sources	Search tips
A Web site	AltaVista	Alta Vista is the best all-purpose search engine for searching the Web. If you use the advanced search features, you will have better results though
A Web site You know the title, but not the URL	HotBot or WebCrawler	Although Webcrawler is not the most comprehensive, it's great for quick and dirty searches, particularly for a site you know exists but have, for some reason, forgot to bookmark or to email the URL to yourself. HotBot is fast and, although it offers many search options, works best with simple searches.
Internet resources in a particular subject area	Yahoo or WWW Virtual Library	You can browse both of these indexes by subject and you can search Yahoo Both are created, evaluated, and updated manually (by humans, that is) rather than automatically, so, in most cases, you will find a selection of greater depth rather than breadth
Internet resources on a specialized topic.	Scholarly Societies Project or Argus Clearinghouse	Both of these subject indexes tend to have listings of more specialized resources or those with a research orientation
What type of resources may be "out there" on the Internet	MetaCrawler or Savvy Search	These meta-indexes will search several of the search indexes, usually returning a few sites from each Using these indexes is a good strategy for finding out whether you are likely to find material on your topic on the web, usenet, or gopher or which indexes will turn up the most sites using your search terms
An answer to a quick reference question	Internet Public Library	Staffed by librarians and library science students, who will answer your questions via email This site also features an excellent collection of ready reference materials (encyclopedias, dictionaries, sourcebooks, and the like)
An email address.	WhoWhere?	You can search by name or institution Email addresses are reguarly updated, really
Current discussion on any topic.	DejaNews	Although the topic of most newsgroups is still either computing or sex, usenet is also a good place to look for recipes, genealogical information, popular culture.
Current discussion in a specialized subject area	Liszt Directory	Liszt is the most comprehensive index of listservs and Internet discussion groups, both popular and scholarly.
Software	Archie	Archie indexes software, datasets, and large text files available via ftp
Print resources	HyTelnet	This list of telnet addresses includes most of the major library catalogs in the US and Europe

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Internet Navigation Tools

This is a directory of some of the more useful Internet navigation tools we've found. All of these tools have their strengths and weaknesses, but some of the best tools to start with have been marked with a recommended icon.

Sections of this page:

- Find resources by subject
- Find resources by keyword
- Find resources by location
- Find resources by type FTP, telnet, WAIS
- Find forums, newsgroups, mailing lists and FAQs
- Find people

See also:

- Internet search strategies recommended
- Internet search QuickGuide
- Internet search tool reviews

Find resources by subject

- Browse resources by subject Berkeley Public Library Internet Index
- Browse resources by subject excite NetReviews
- Browse resources by subject Galaxy
- Browse resources by subject LookSmart
- Browse resources by subject Magellan
- Browse resources by subject· NetGuide Live's Best of the Web
- Browse resources by subject Penn Library Internet Resources
- Browse resources by subject. Point Reviews
- Browse resources by subject· Ready Reference Collection of the Internet Public Library
- Browse resources by subject Infoseek subject menus
- Browse resources by subject· Whole Internet Catalog (for GNN subscribers)
- Browse resources by subject WWW Virtual Library
- Browse resources by subject Yahoo recommended
- Browse resources by subject· Other scholarly subject directories
- Browse scholarly societies by subject (from the Scholarly Societies Project)
- Browse subject guides the Argus Clearinghouse
- Search Usenet news and mailing lists selected by subject Reference.com

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Find resources by keyword

- Search resources by title or subject Yahoo search recommended
- Search resources by title Galaxy entry search
- Search WWW by abstract CUI W3 Catalog
- Search WWW by citation· WWW Worm
- Search WWW by full text Alta Vista recommended
- Search WWW by full text excite NetSearch
- Search WWW by full text. Harvest WWW home page broker
- Search WWW by full text HotBot
- Search WWW by full text. Inktomi
- Search WWW by full text Infoseek search recommended
- Search WWW by full text: WebCrawler
- Search WWW by reviews· excite NetReviews
- Search WWW by reviews: Magellan
- Search WWW by summary· Lycos

- Search WWW by title: ALIWEB (mirror at navy mil)
- Search WWW by title: Galaxy WWW search
- Search multiple WWW indexes at once. MetaCrawler recommended
- Search multiple WWW indexes at once: Savvy Search
- Search multiple WWW indexes at once Use It
- Search gopher by title: Veronica
- Search gopher by title: Galaxy gopher search
- Search FTP archives by filename: Archie

Find resources by location

- All the WWW sites in the world master list from CERN and its short form
- WWW servers arranged by geography: Virtual Tourist
- All the Gopher sites in the world master list from UMinn
- All the Gopher sites in the world. another list from WLU

Find resources by type: FTP, telnet, WAIS

(For WWW and gopher resources, see also Find resources by subject and Find resources by keyword)

- Search FTP archives by filename Archie
- Search WAIS directory of servers
- Browse WAIS directory of servers
- Search telnet-based resources: HyTelnet
- Browse telnet-based resources the Yanoff list

Find forums, newsgroups, mailing lists and FAQs

- Browse mailing list descriptions: the Directory of Scholarly and Professional E-conferences
- Browse mailing list descriptions the Publicly Accessible Mailing Lists (PAML) list
- Search mailing list descriptions Bitnet and Internet Interest Groups
- Search mailing list descriptions the Directory of Scholarly and Professional E-conferences
- Search mailing list descriptions the "List of Lists"
- Search mailing list descriptions Liszt Directory of E-Mail Discussion Groups recommended
- Search mailing list descriptions Reference com mailing list directory

- Browse Usenet news via your local news server
- Browse Usenet news Reference.com Usenet archive
- Find Usenet newsgroups by discussion topic DejaNews Query Profile
- Find Usenet newsgroups by title of group Newsgroups Info Center search
- Find Usenet newsgroups by title of group: Reference com newsgroup directory
- Search Usenet news and mailing list archives by full text Reference com
- Search Usenet news by full text Alta Vista recommended
- Search Usenet news by full text DejaNews

- Browse Usenet Frequently Asked Questions files (FAQs) via WWW recommended
- Browse Usenet Frequently Asked Questions files (FAQs) via gopher
- Browse Usenet Frequently Asked Questions files (FAQs) via FTP
- Search Usenet Frequently Asked Questions files (FAQs) by title
- Search Usenet Frequently Asked Questions files (FAQs) by full text

- Search WWW forums: Forum One

Find people

- Rice University Campus Directory
- Find people by institution CSO nameserver (ph) databases recommended

- Find people by institution: X.500 databases (via InterNIC)
- Find people by institution: X.500 databases (via UMich)
- Find people by institution: Whois databases
- Find people by Internet site: Finger (form: *name@site*)
- Find people by Internet site: Netfind (form: *name site*)
- Find people by name or institution: InterNIC Whois search
- Find people by name or institution: WhoWhere? recommended
- Find people by name: Four11 Directory Services (for registered Four11 users only)
- Find people by name: Switchboard
- Find personal web pages by institution: Personal Pages Worldwide
- Find personal web pages by institution: student net home page directory

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Search Tool Reviews

Subject Index	Organization	Scope	Updates
Argus Clearinghouse	Subject guides are organized by broad categories	Subject guides include web, gopher, and telnet.	Only guides that are currently maintained and regularly updated.
Magellan	Search by keyword or browse by broad subject categories	Web, gopher, FTP, and usenet sites are included. Sites with the green light are "family-friendly".	Updated infrequently
Point	Includes mostly web sites	Point weighs appearance rather heavily, so text-based resources suffer under their rating system. Likewise, scholarly resources may not rate as high as personal or even commercial sites with better graphics	Updated infrequently
WWW Virtual Library	Sites are classified by Library of Congress subject headings.	Includes mainly web resources.	New sites are added irregularly but existing sites are checked for currency
Yahoo	Sites are classified by over twenty broad subject categories, each with subcategories for greater specificity	Mainly indexes web pages and chooses not include certain topics, namely extremist groups and pornography	Yahoo updates URLs regularly and weeds out sites that have moved, stagnated, or otherwise degenerated

Search Engine	Capabilities	Scope	Updates
Alta Vista	The default for searching is OR. You can combine terms with +, eliminate a term with -, truncate a word with *, and search for two words together using ; between the two with no spaces (blue,moon)	Indexes the full-text of the web and usenet and claims to be the most comprehensive	Duplicates are removed, but downed links are not
Excite	Excite searches by concept This simply means that you may type in a phrase or sentence rather than a group of words It does ignore prepositions, articles, other short words If you search, "How blue is the moon?," and then, "How often is once in a blue moon?," you will get a list of sites containing the words blue and moon Use + to combine terms, - to eliminate them	Full-text of web pages.	Added daily, weeded infrequently
HotBot	The default for searching is OR. A pop-up menu allows you to search using and, or, not, adj Once you've entered your search terms, it saves your search so you may choose to narrow or broaden your search. Affords searching by media type (Java, Shockwave, VRML, etc.).	Indexes the full-text of web pages. Like the others, it claims to be the largest.	Added daily, may or may not be weeded (too soon to tell)
	The default for searching is OR You can restrict your searches to title or URL as well		Downed links

InfoSeek Ultra	restrict your searches to title or URL as well as search the full-text To combine terms, use + To eliminate terms, use - To search for a phrase, use quotation marks around it.	Searches the full-text of the web.	and abandoned sites are not weeded out
Lycos	The default for combining terms is OR. You must go to the advanced search form to use any other search features.	Searches the title and URL of web pages	New sites added daily, but invalid sites are not removed
WebCrawler	The default search uses AND. You may search using AND, OR, NOT, or NEAR. Use quotation marks to search for a phrase	Indexes the title and URL of web pages	Old sites are not regularly weeded out

MetaSearch Engine	**Capabilities**	**Scope**	**Updates**
Internet Sleuth	Lets you select a maximum search time and number of hits. Mainly supports simple searches	Searches up to ten of the following: A2Z, Aliweb, Alta Vista, Excite, Galaxy, Inktomi, Lycos, Open Text, Point, Webcrawler, and Yahoo. Provides links to other search engines individually	Duplicates not removed
MetaCrawler	You can search for a phrase by placing parentheses around your terms or combine terms with AND MetaCrawler only provides ten hits from each database	Searches Open Text, Lycos, WebCrawler, InfoSeek, Excite, Inktomi, Alta Vista, Yahoo, and Galaxy.	Eliminates outdated links (404 Not Found) and duplicates
Savvy Search	This engine lets you limit searches to WWW Resources, software, people, reference, commercial, academic, technical reports, images, news, and entertainment choosing the appropriate databases A pop-up menu lets you broaden or narrow your search as well as choose the number of results from each search index. You can also enter your search in over 20 languages	Searches Aliweb, Alta Vista, DejaNews, Excite, Galaxy, Infoseek, Lycos, Magellan, Open Text, Point, WebCrawler, WhoWhere, Yahoo, among many others.	Eliminates duplicates and outdated links
Use It	You can submit simple keyword searches from a selection of over fifty Internet search indexes and select a maximum search time	Includes many European indexes and has a strong business and computer focus	Does not eliminate duplicates or outdated links

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